FIG. 1

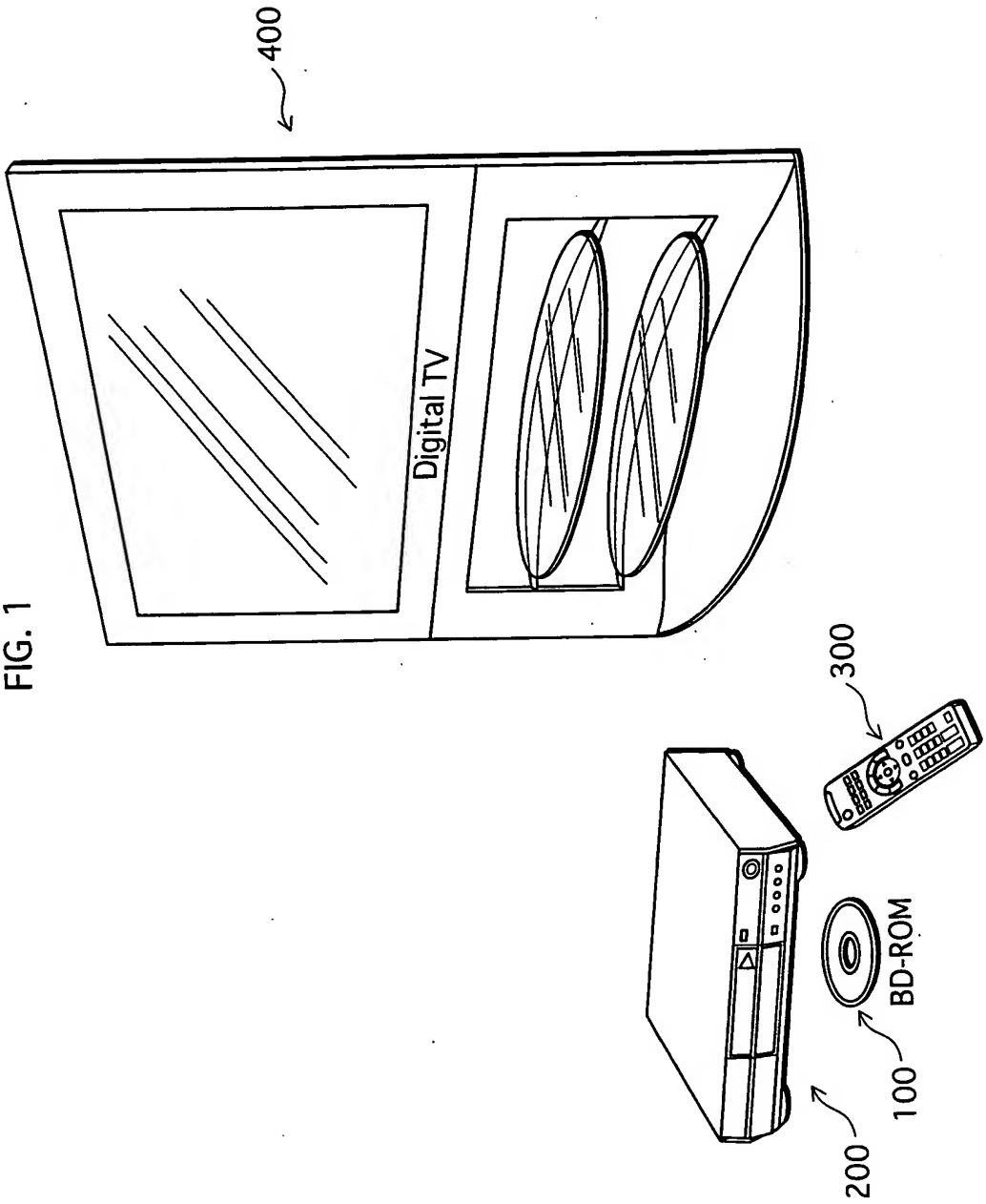


FIG. 2

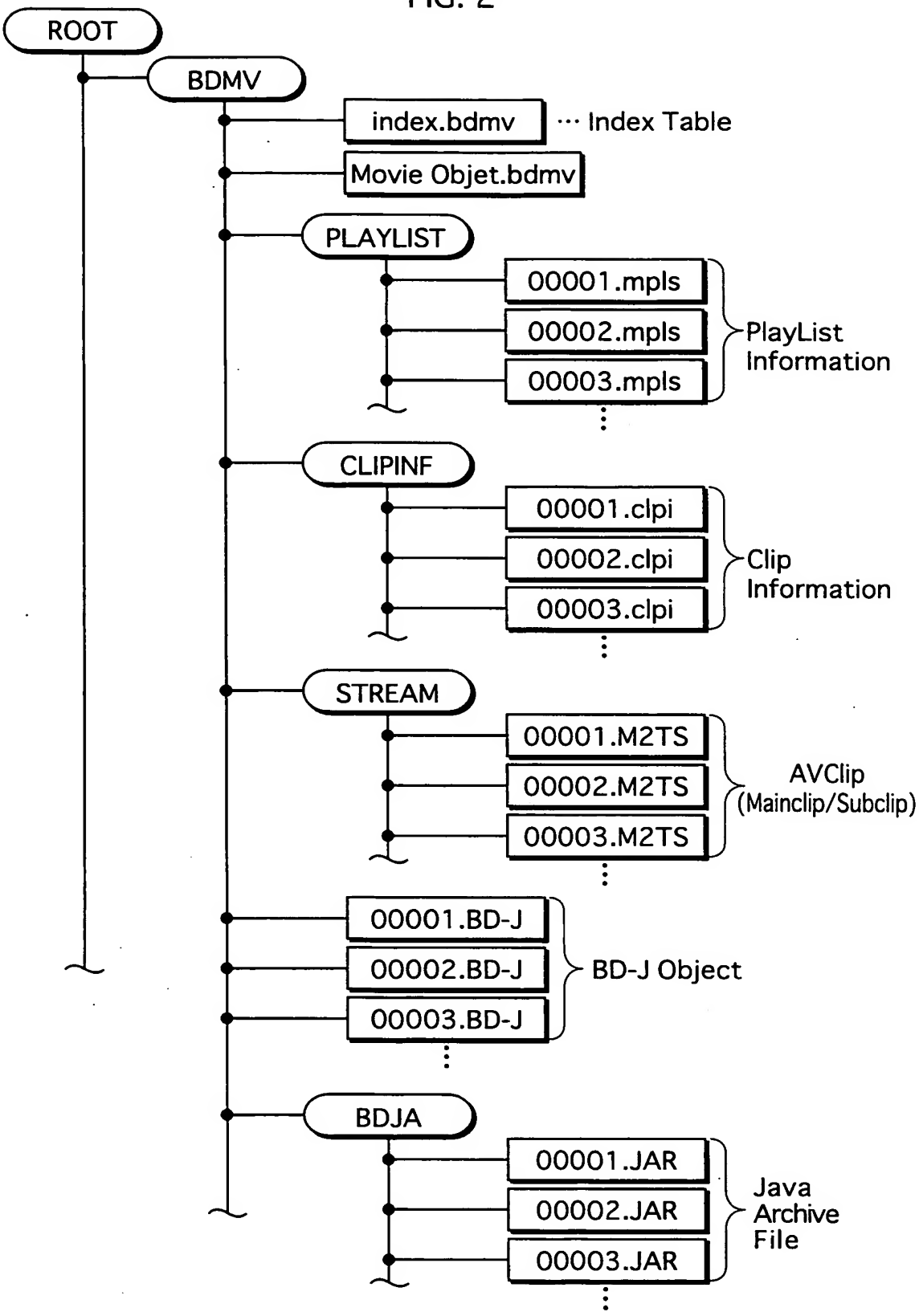

ROOT
BDMV
index.bdmv
··· Index Table
Movie Objet.bdmv
PLAYLIST
00001.mpls
00002.mpls
00003.mpls
PlayList Information
CLIPINF
00001.clpi
00002.clpi
00003.clpi
Clip Information
STREAM
00001.M2TS
00002.M2TS
00003.M2TS
AVClip (Mainclip/Subclip)
00001.BD-J
00002.BD-J
00003.BD-J
BD-J Object
BDJA
00001.JAR
00002.JAR
00003.JAR
Java Archive File

FIG. 3

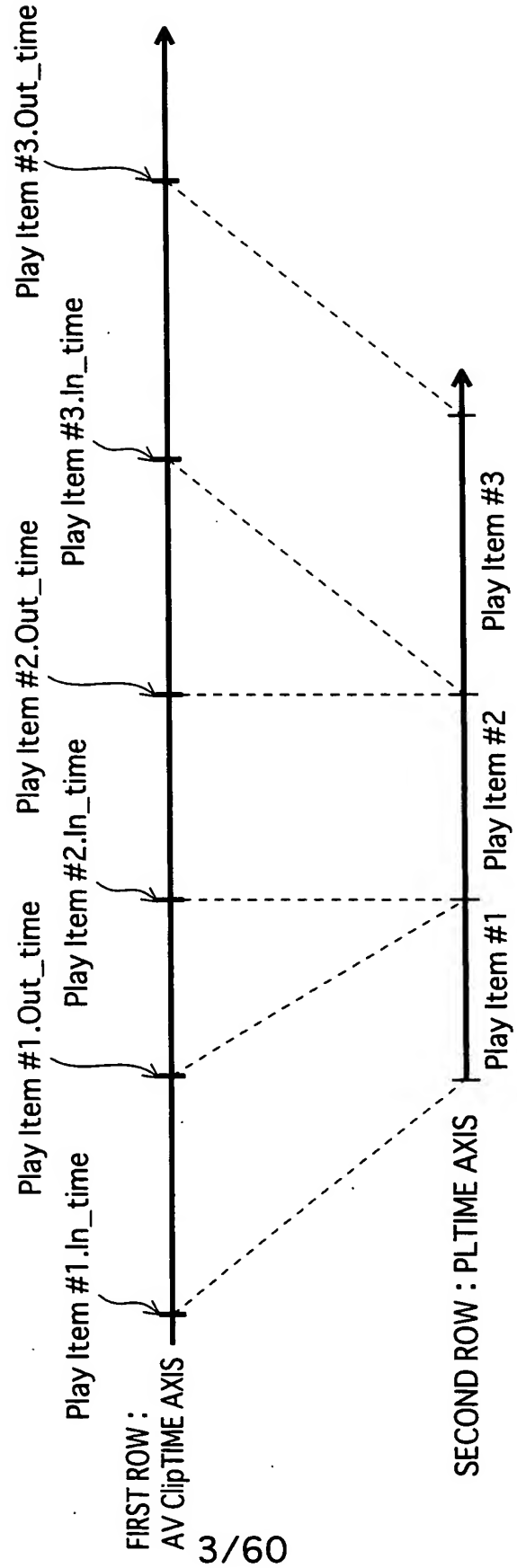

Play Item #3.Out_time
Play Item #3.In_time
Play Item #2.Out_time
Play Item #2.In_time
Play Item #1.Out_time
Play Item #1.In_time
FIRST ROW :
AV ClipTIME AXIS
SECOND ROW : PLTIME AXIS
Play Item #1
Play Item #2
Play Item #3

FIG. 4

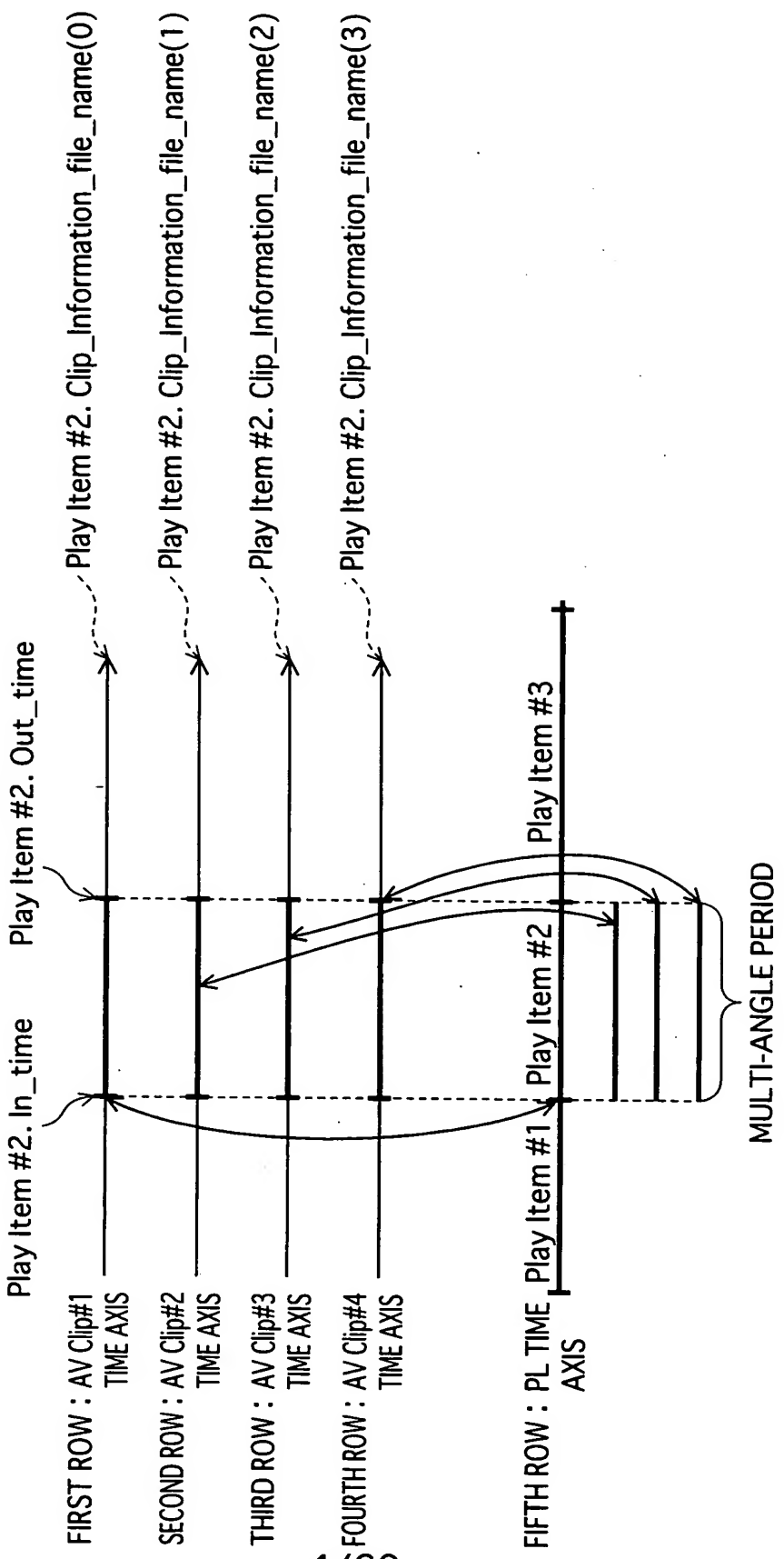

Play Item #2. Clip_Information_file_name(0)
Play Item #2. Clip_Information_file_name(1)
Play Item #2. Clip_Information_file_name(2)
Play Item #2. Clip_Information_file_name(3)
Play Item #2. In_time
Play Item #2. Out_time
Play Item #3
Play Item #2
Play Item #1
FIRST ROW : AV Clip#1 TIME AXIS
SECOND ROW : AV Clip#2 TIME AXIS
THIRD ROW : AV Clip#3 TIME AXIS
FOURTH ROW : AV Clip#4 TIME AXIS
FIFTH ROW : PL TIME AXIS
MULTI-ANGLE PERIOD

FIG. 5

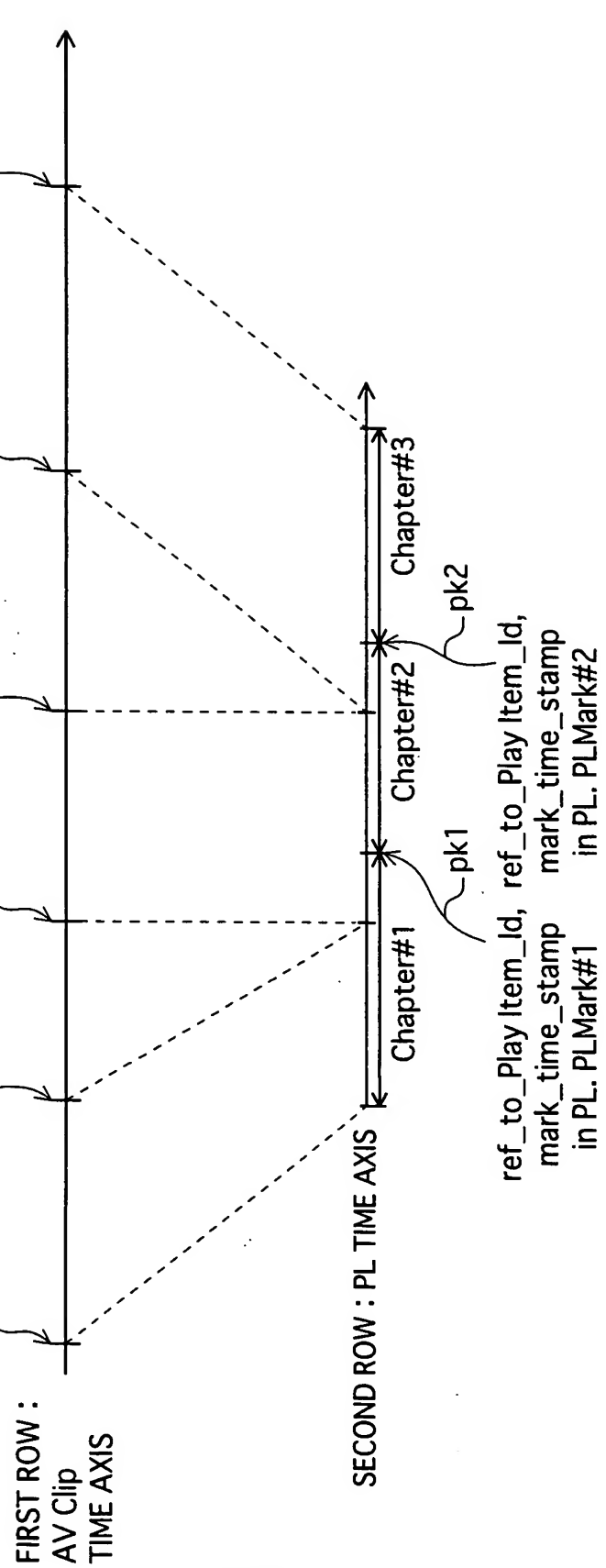

Play Item #1.Out_time
Play Item #2.Out_time
Play Item #3.Out_time
Play Item #1.In_time
Play Item #2.In_time
Play Item #3.In_time
FIRST ROW :
AV Clip
TIME AXIS
SECOND ROW : PL TIME AXIS
Chapter#1
Chapter#2
Chapter#3
pk1
pk2
ref_to_Play Item_Id,
mark_time_stamp
in PL. PLMark#1
ref_to_Play Item_Id,
mark_time_stamp
in PL. PLMark#2

FIG. 6

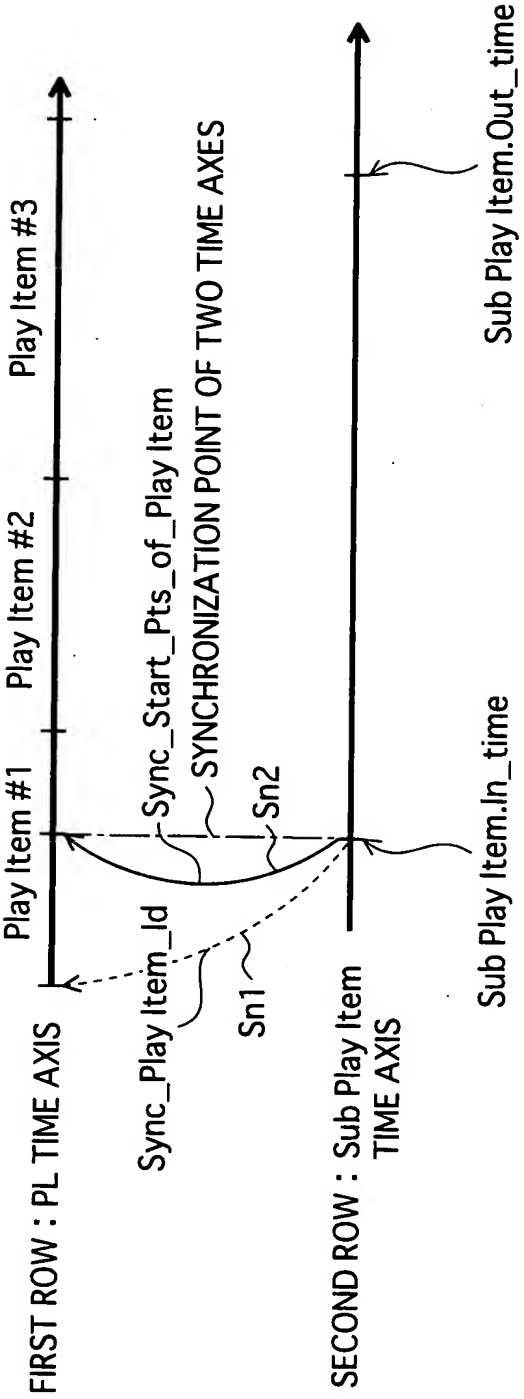

FIRST ROW : PL TIME AXIS
Play Item #1
Play Item #2
Play Item #3
Sync_Play Item_Id
Sync_Start_Pts_of_Play Item
SYNCHRONIZATION POINT OF TWO TIME AXES
Sn1
Sn2
SECOND ROW : Sub Play Item TIME AXIS
Sub Play Item.In_time
Sub Play Item.Out_time

FIG. 7A

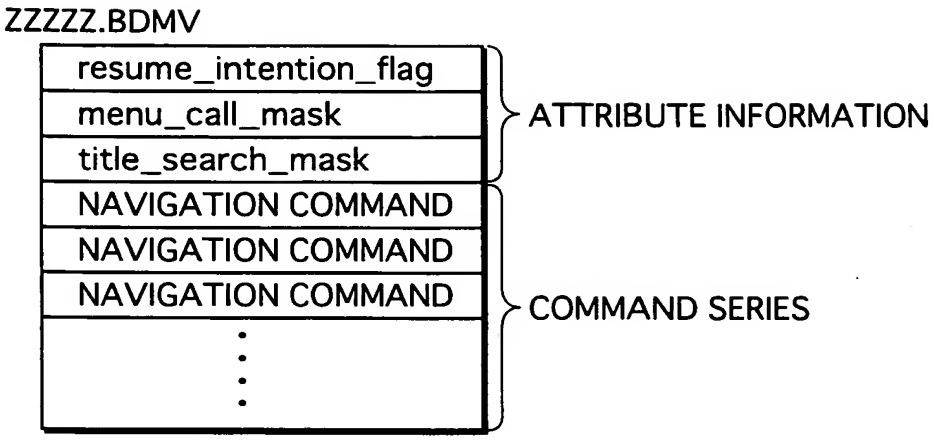


FIG. 7B

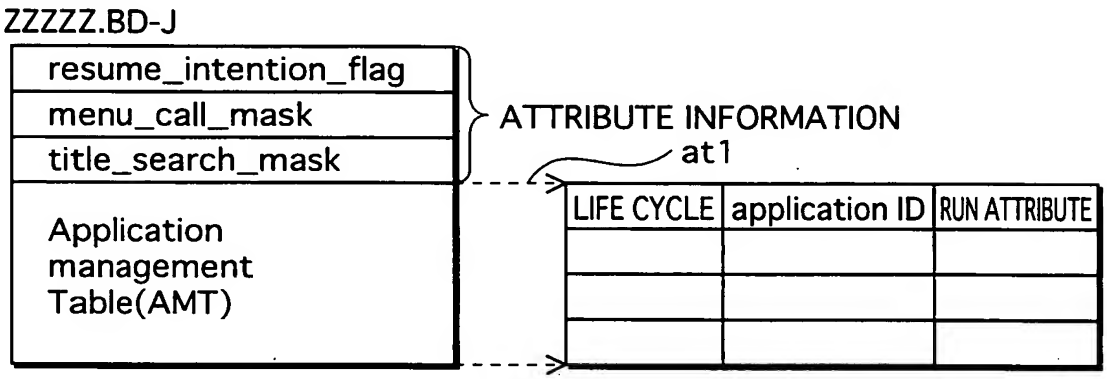


FIG. 7C

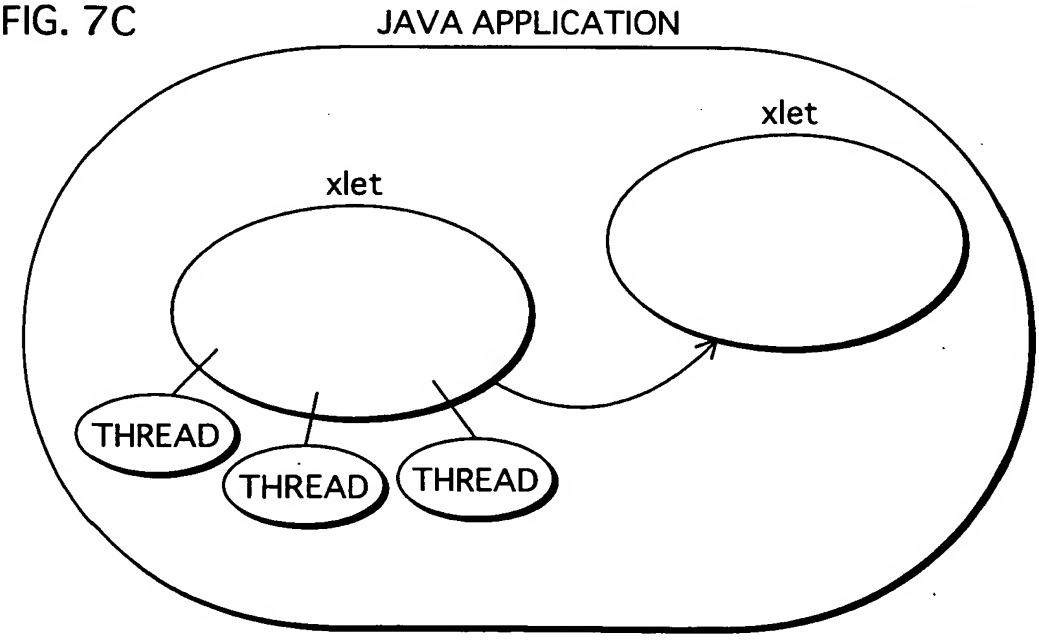


FIG. 8A

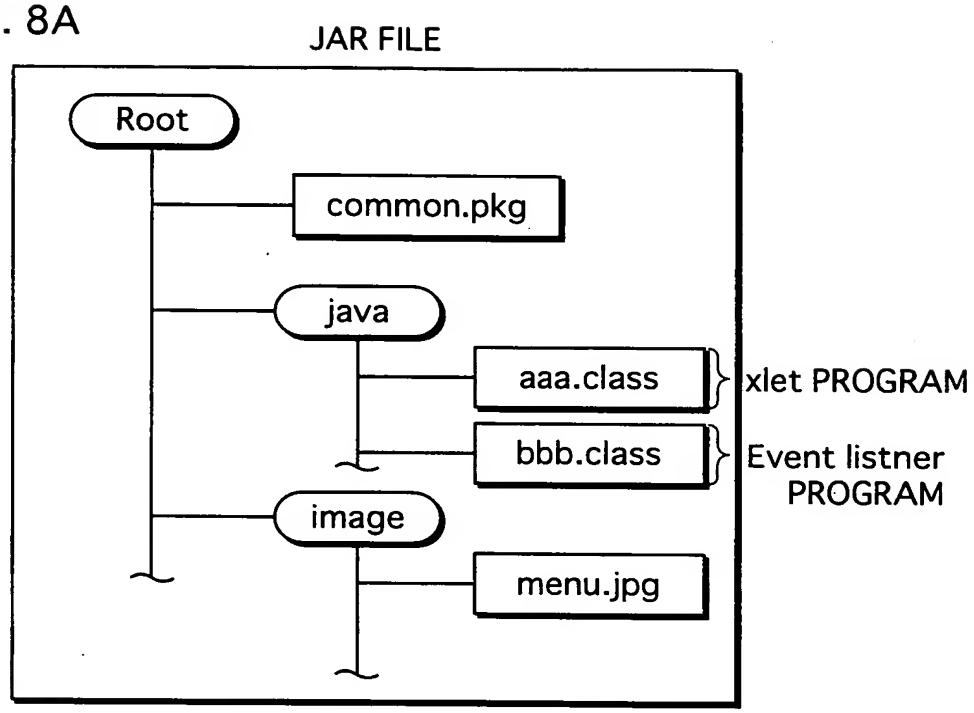
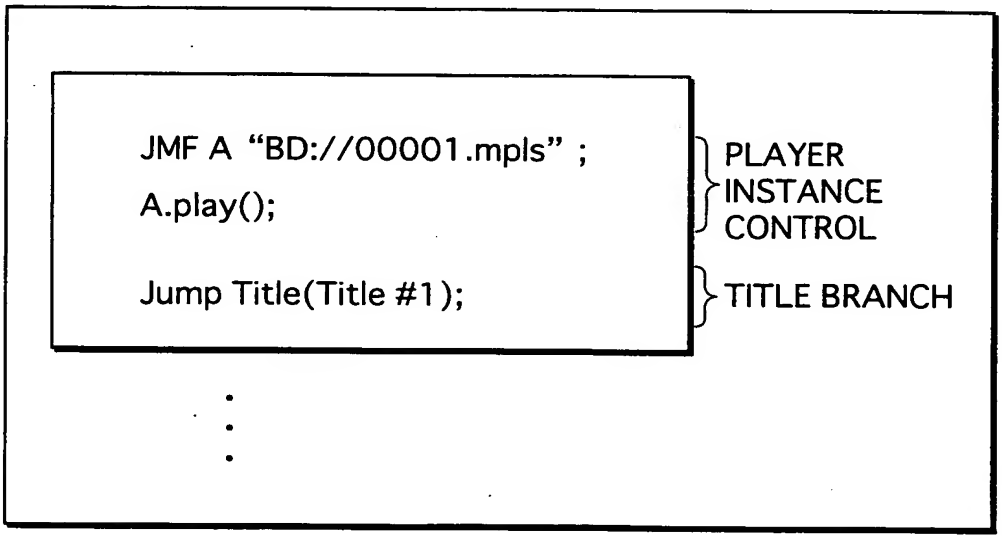

JAR FILE
Root
common.pkg
java
aaa.class
bbb.class
image
menu.jpg
xlet PROGRAM
Event listner PROGRAM

FIG. 8B


xlet PROGRAM
JMF A "BD://00001.mpls" ;
A.play();
Jump Title(Title #1);
PLAYER INSTANCE CONTROL
TITLE BRANCH

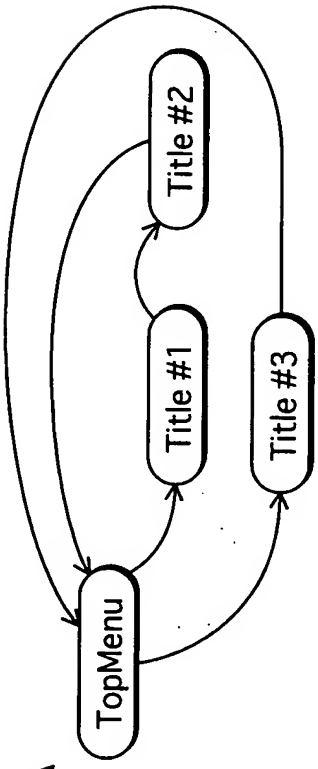

TopMenu
Title #1
Title #2
Title #3

FIG. 9A

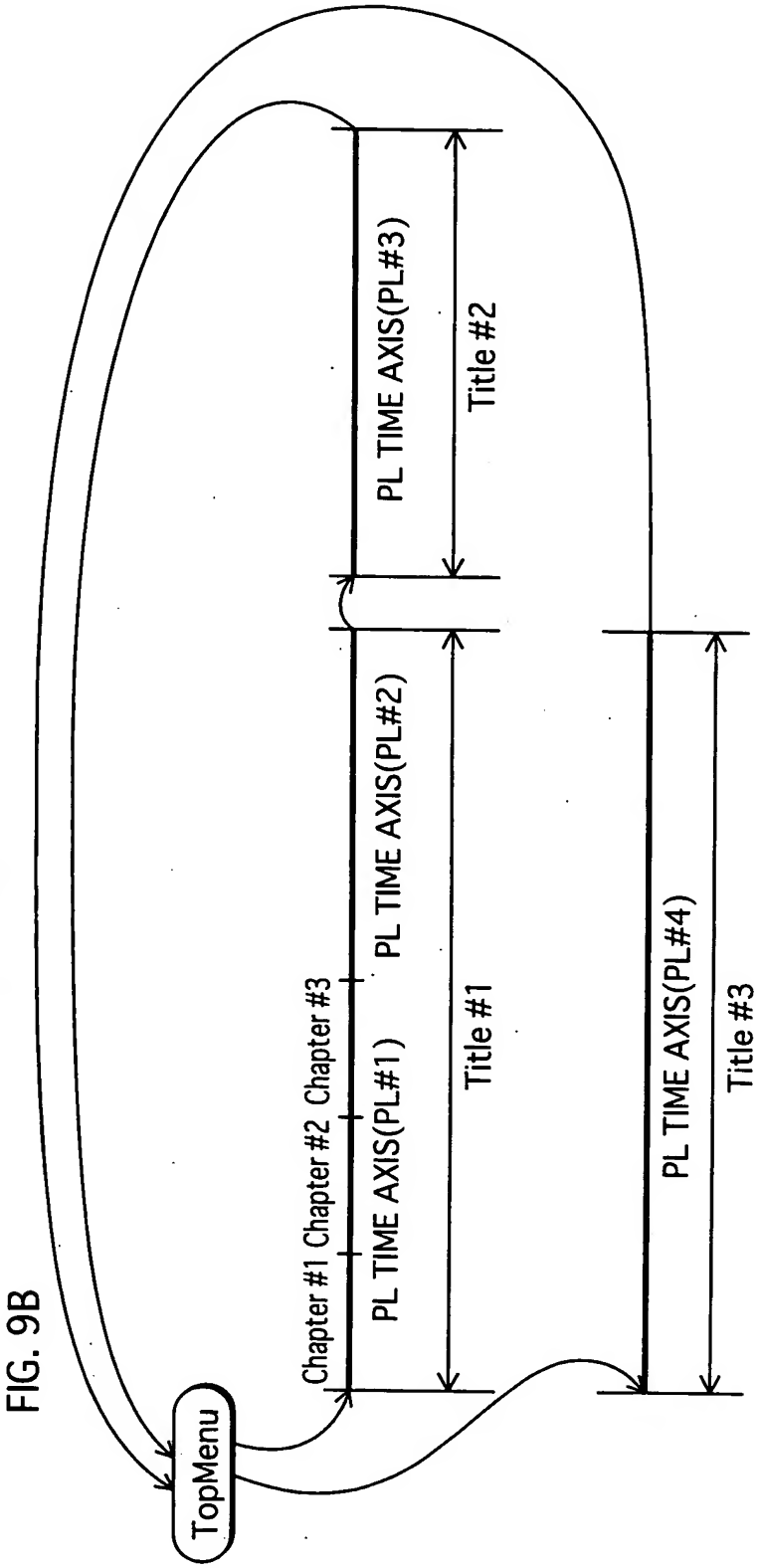

TopMenu
Chapter #1
Chapter #2
Chapter #3
PL TIME AXIS(PL#1)
PL TIME AXIS(PL#2)
PL TIME AXIS(PL#3)
PL TIME AXIS(PL#4)
Title #1
Title #2
Title #3

FIG. 9B

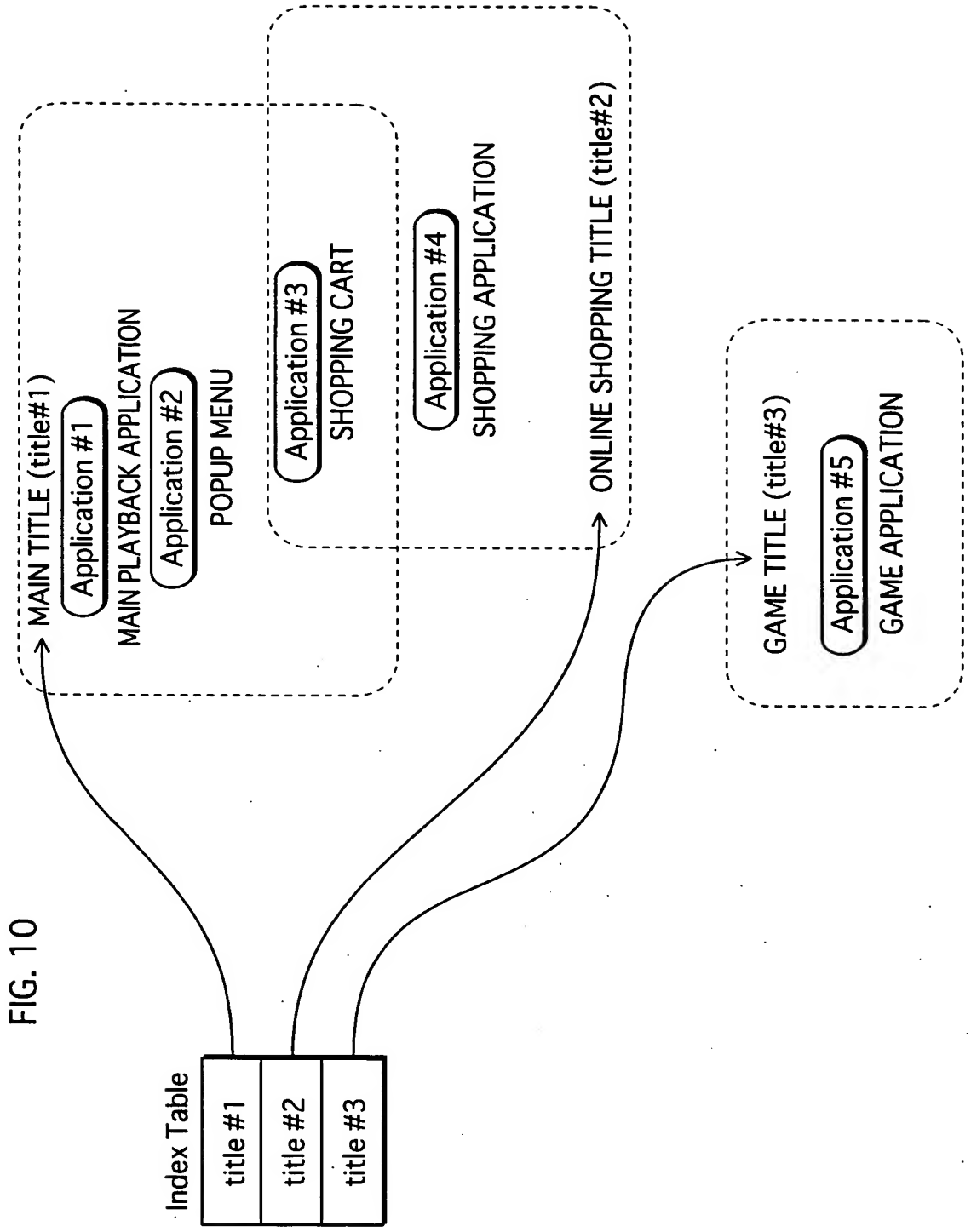

Index Table
title #1
title #2
title #3
MAIN TITLE (title#1)
Application #1
MAIN PLAYBACK APPLICATION
Application #2
POPUP MENU
Application #3
SHOPPING CART
Application #4
SHOPPING APPLICATION
ONLINE SHOPPING TITLE (title#2)
GAME TITLE (title#3)
Application #5
GAME APPLICATION

FIG. 10

FIG. 11

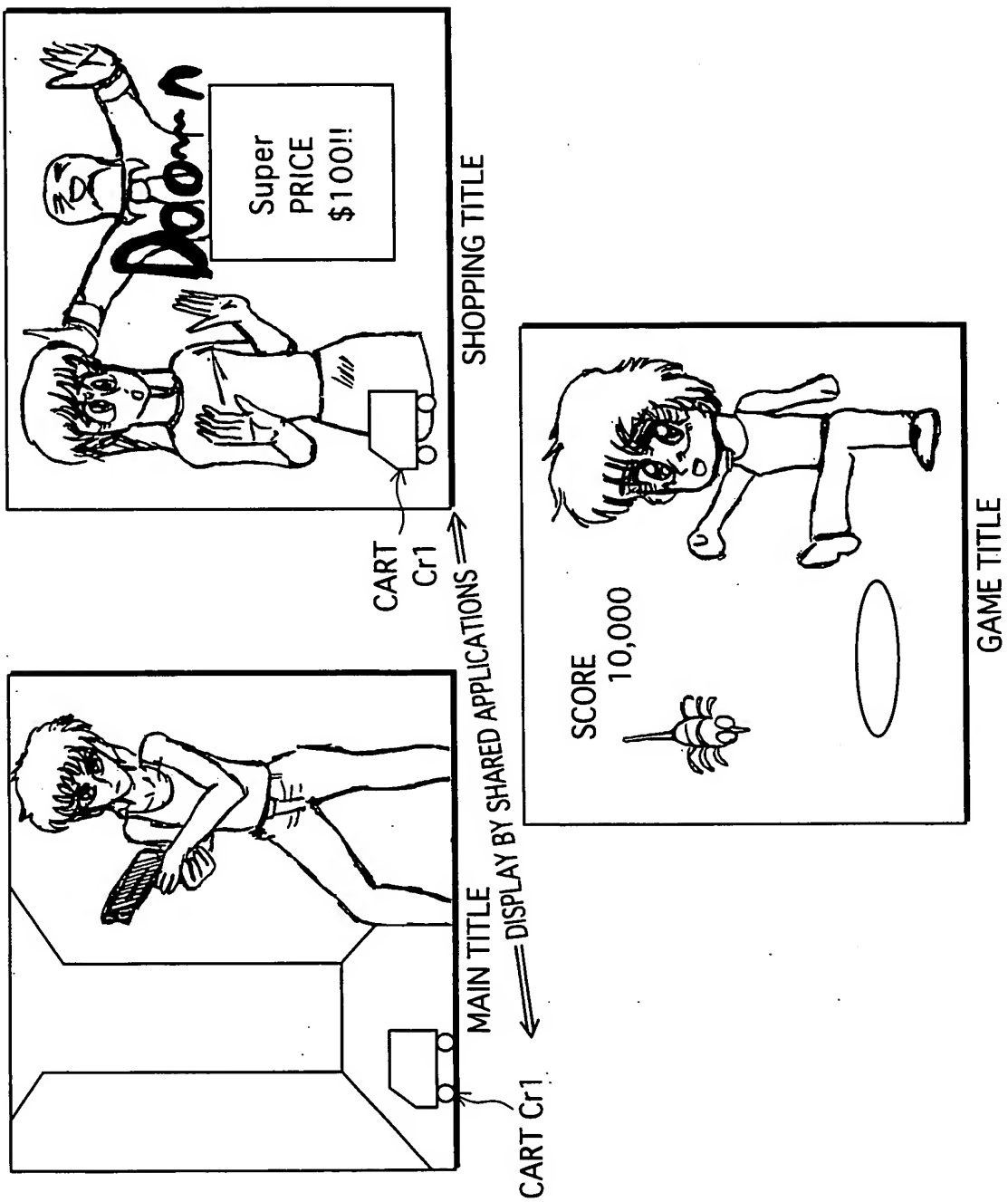

Super
PRICE
$100!!
SHOPPING TITLE
CART
Cr1
DISPLAY BY SHARED APPLICATIONS
MAIN TITLE
CART Cr1
SCORE
10,000
GAME TITLE

FIG. 12A

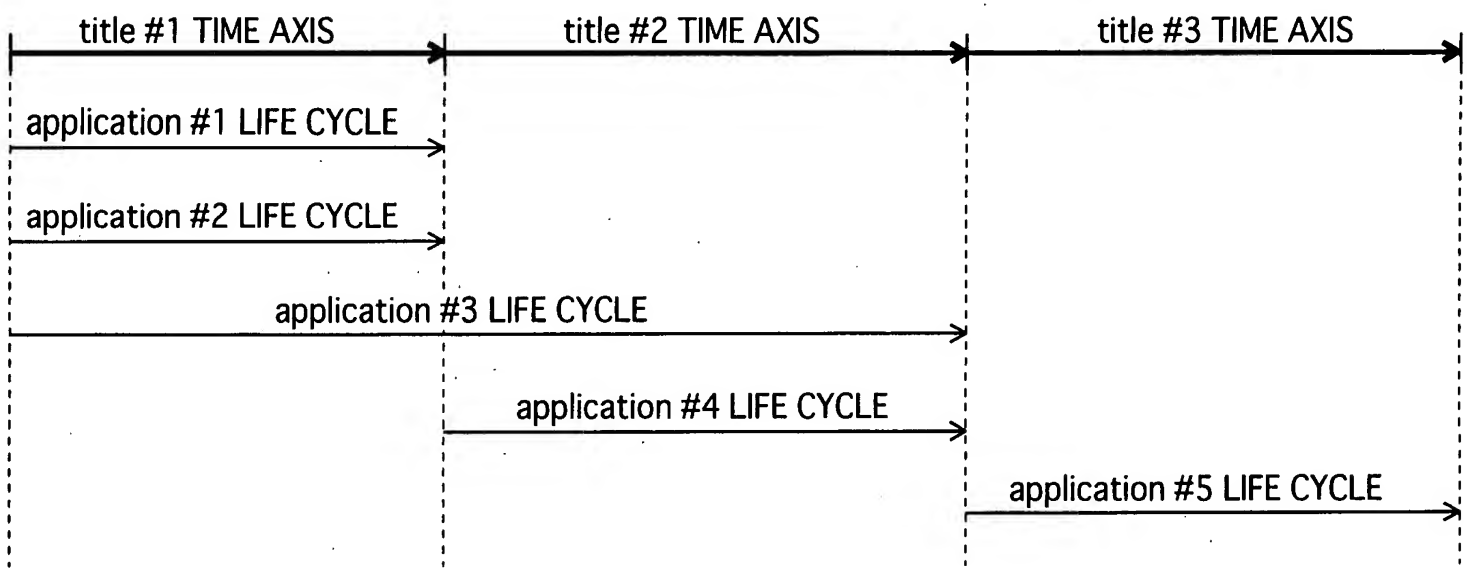


FIG. 12B

title #1 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #1	application #1	
title #1	application #2	
title #1	application #3	

title #2 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #2	application #3	
title #2	application #4	

title #3 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #3	application #5	

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FIG. 13A

title #1 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #1	application #1	AutoRun
title #1	application #2	Persistent
title #1	application #3	AutoRun

title #2 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #2	application #3	Persistent

FIG. 13B

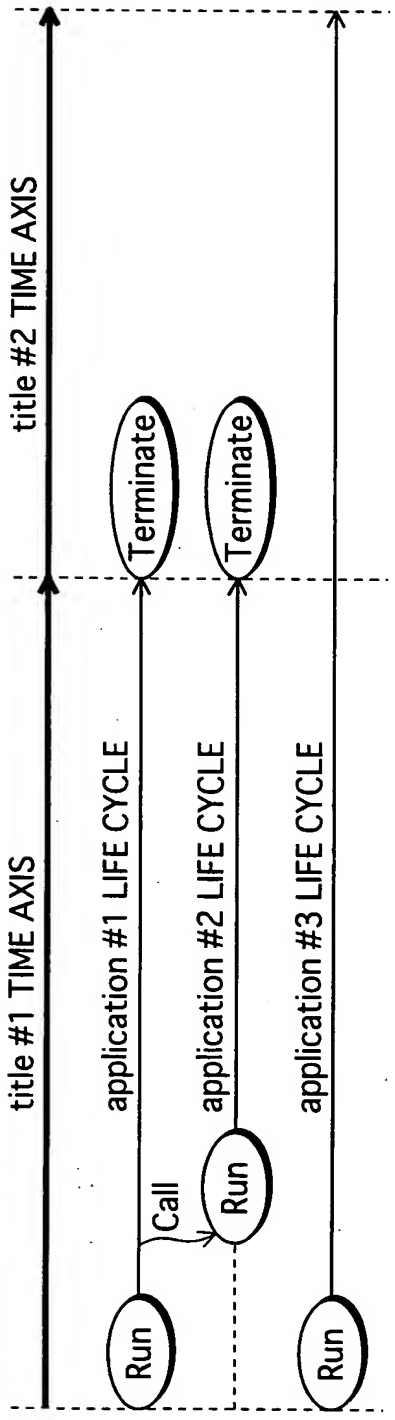


FIG. 14A

title #1 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #1	application #1	AutoRun
title #1	application #2	AutoRun

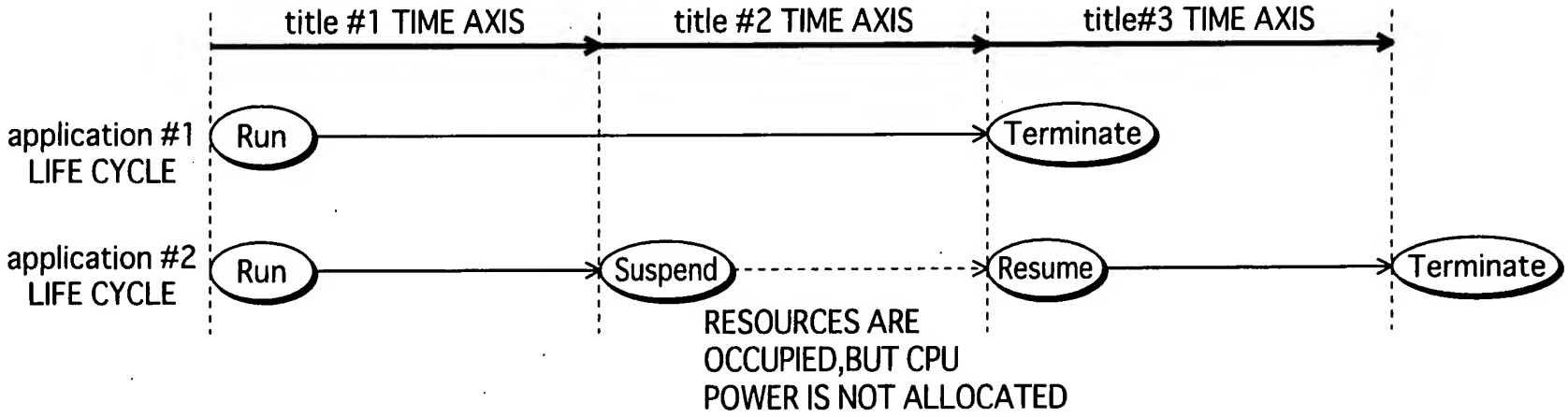
title #2 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #2	application #1	Persistent
title #2	application #2	Suspend

title #3 APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE
title #3	application #2	Persistent

FIG. 14B



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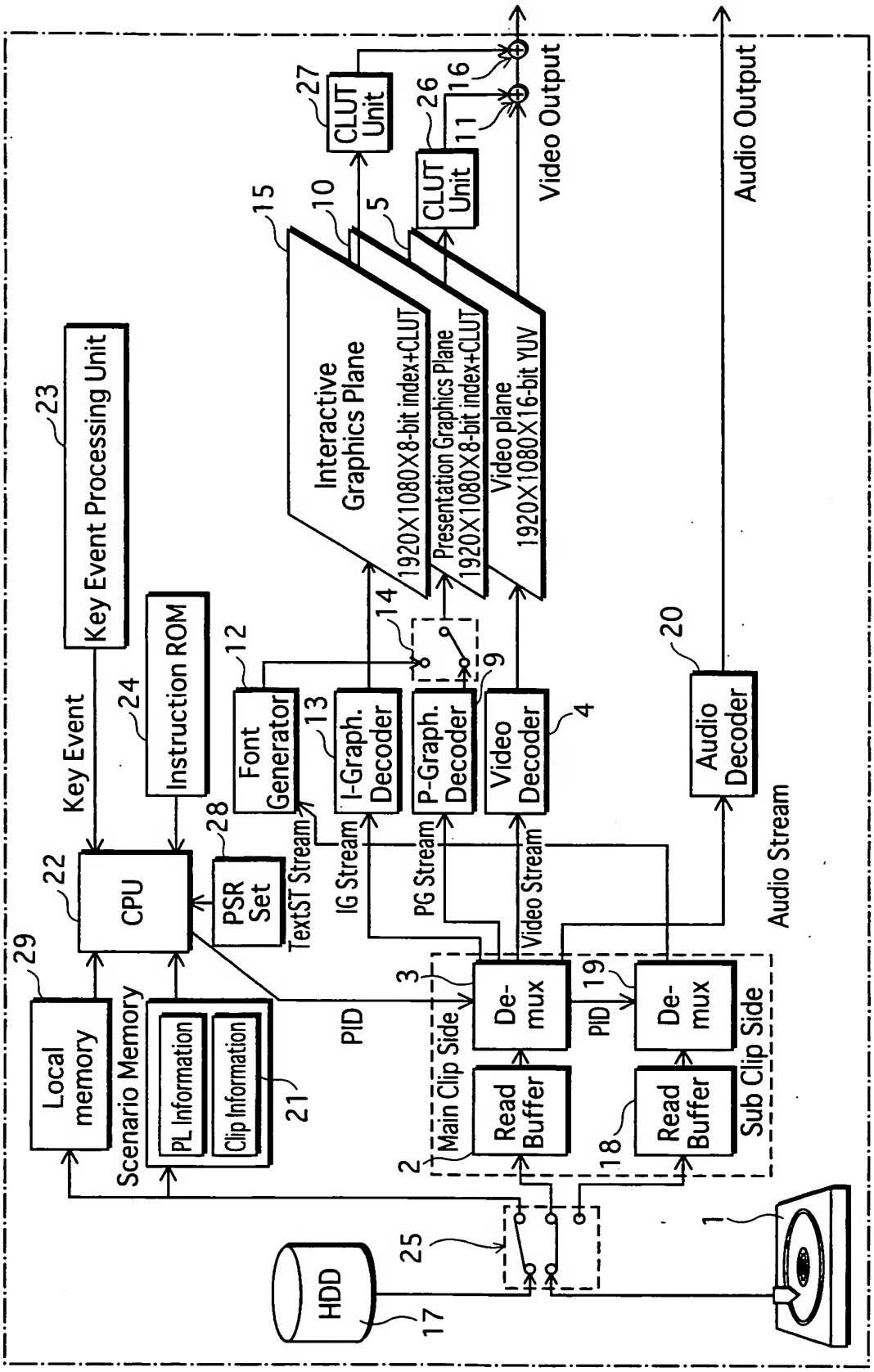
J.W. Price/ 714-427-7420

FIG. 15

CHANGE IN APPLICATION STATUS ACCORDING TO RUN ATTRIBUTES

Application Status in Previous Title	Run Attribute		
	Persistent	AutoRun	Suspend
Not Run	Maintain status without performing operation	Run Application	Maintain status without performing operation
Running	Maintain status without performing operation	Maintain status without performing operation	Suspend
Suspend	Resume	Resume	Maintain status without performing operation

FIG. 16


Video Output
Audio Output
Interactive Graphics Plane
1920X1080X8-bit index+CLUT
Presentation Graphics Plane
1920X1080X8-bit index+CLUT
Video plane
1920X1080X16-bit YUV
CLUT Unit
CLUT Unit
Key Event Processing Unit
Instruction ROM
Font Generator
I-Graph. Decoder
P-Graph. Decoder
Video Decoder
Audio Decoder
Key Event
CPU
PSR Set
TextST Stream
IG Stream
PG Stream
Video Stream
Audio Stream
Local memory
Scenario Memory
PL Information
Clip Information
PID
Main Clip Side
Sub Clip Side
De-mux
De-mux
Read Buffer
Read Buffer
HDD

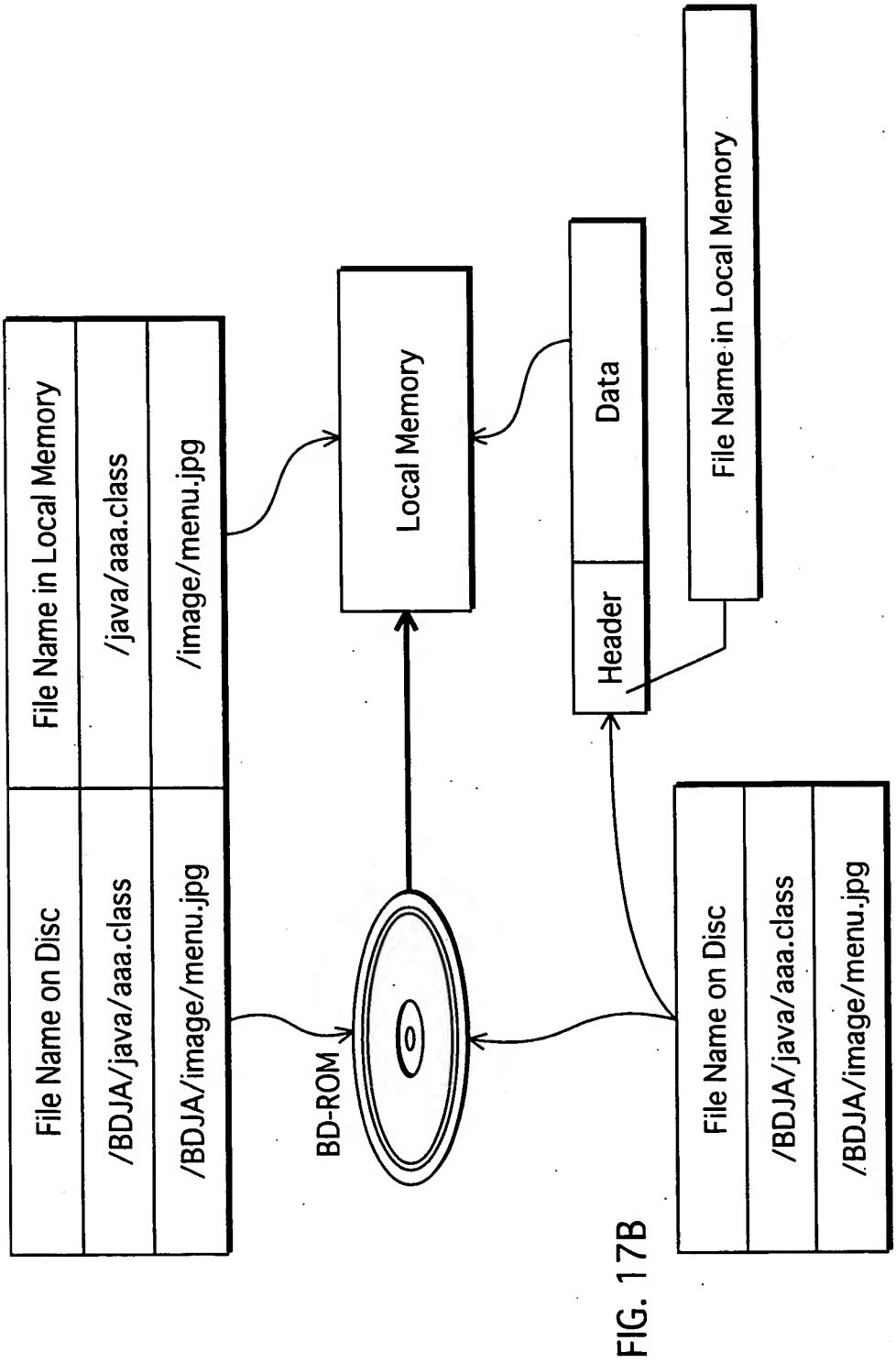


FIG. 17A

FIG. 17B

FIG. 18

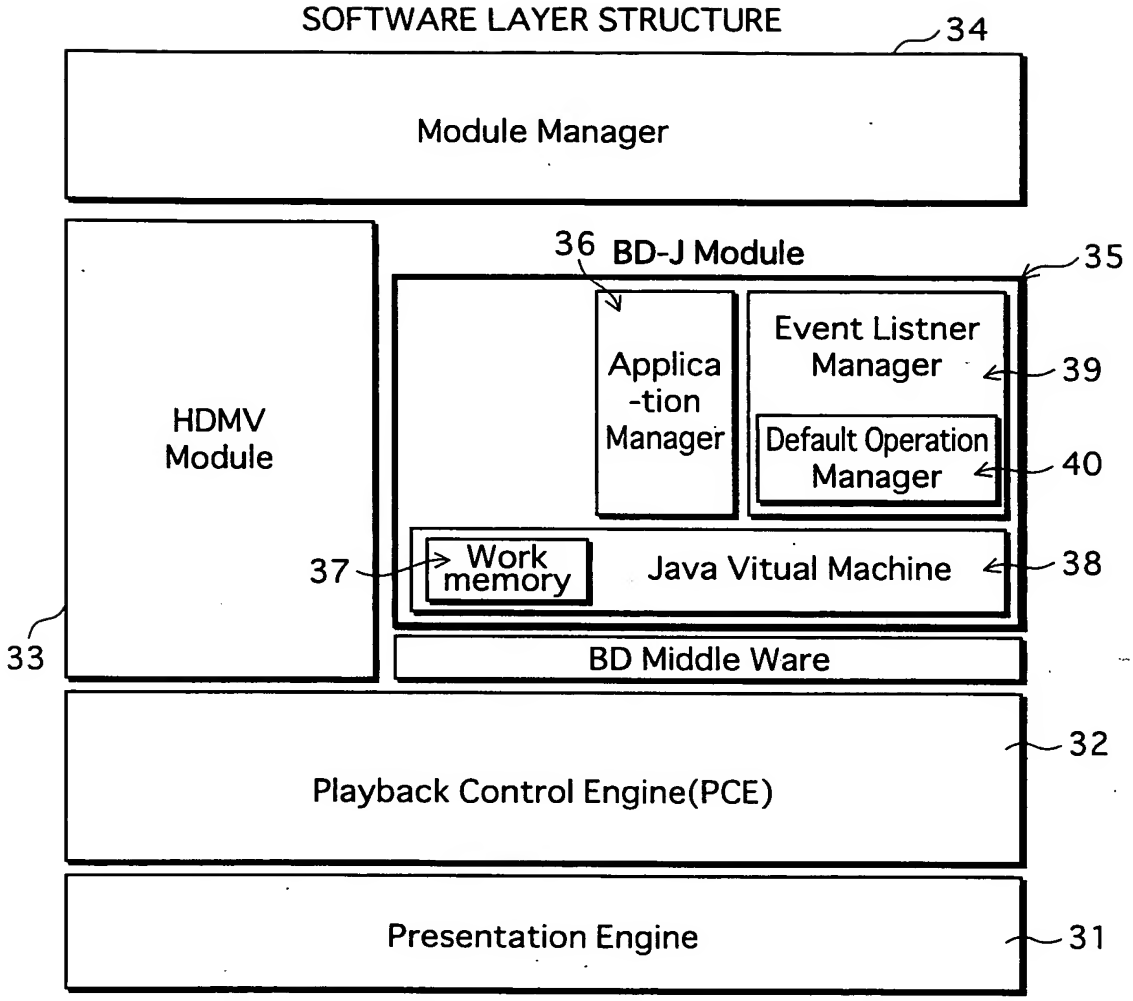

SOFTWARE LAYER STRUCTURE
34
Module Manager
HDMV Module
33
36
BD-J Module
35
Applica -tion Manager
Event Listner Manager
39
Default Operation Manager
40
37
Work memory
Java Vitual Machine
38
BD Middle Ware
Playback Control Engine(PCE)
32
Presentation Engine
31

FIG. 19

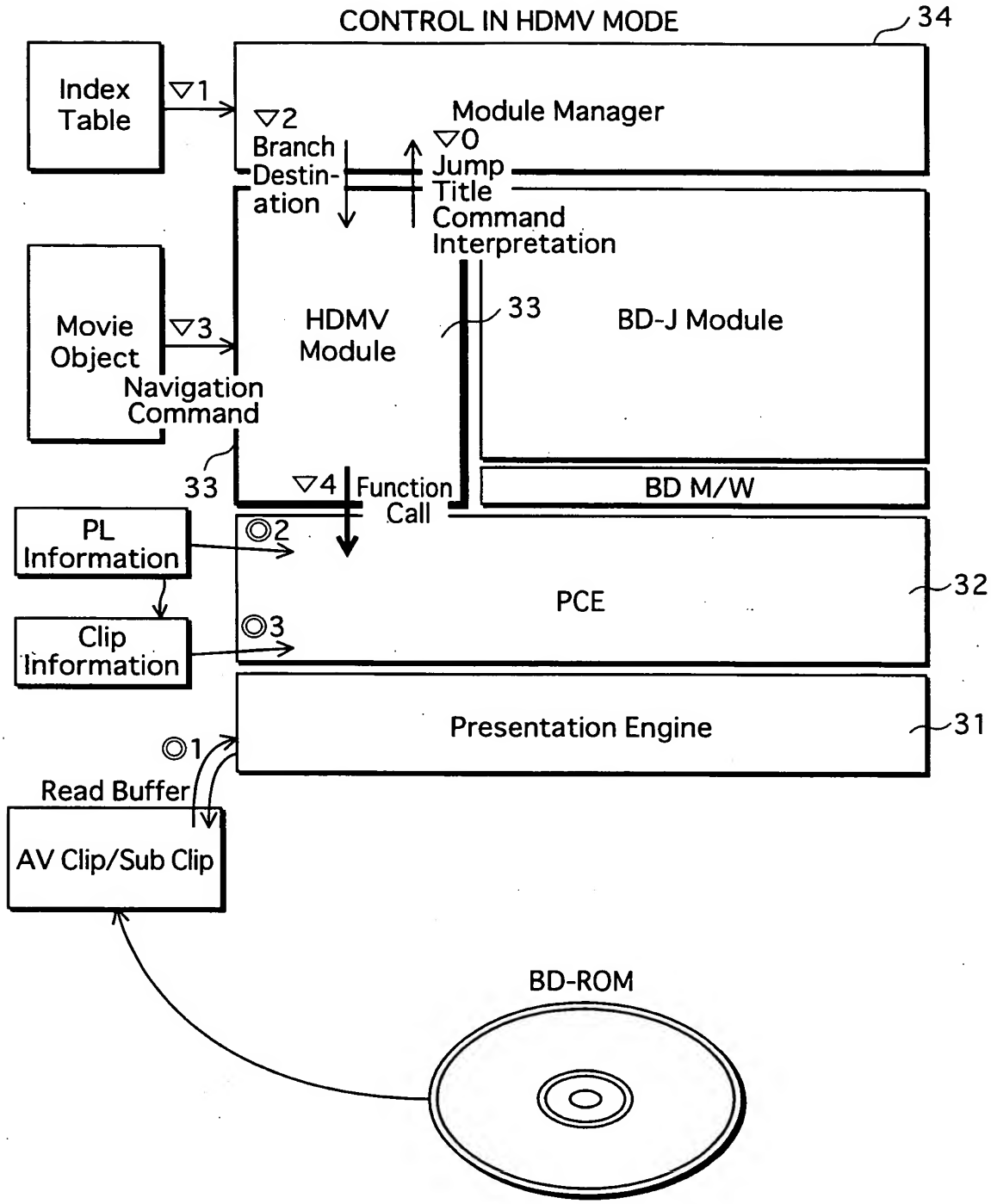

CONTROL IN HDMV MODE
34
Index Table
▽1
▽2
Branch Destin-ation
Module Manager
▽0
Jump Title
Command Interpretation
Movie Object
▽3
Navigation Command
HDMV Module
33
BD-J Module
33
▽4
Function Call
BD M/W
PL Information
◎2
PCE
32
Clip Information
◎3
Presentation Engine
31
◎1
Read Buffer
AV Clip/Sub Clip
BD-ROM

FIG. 20

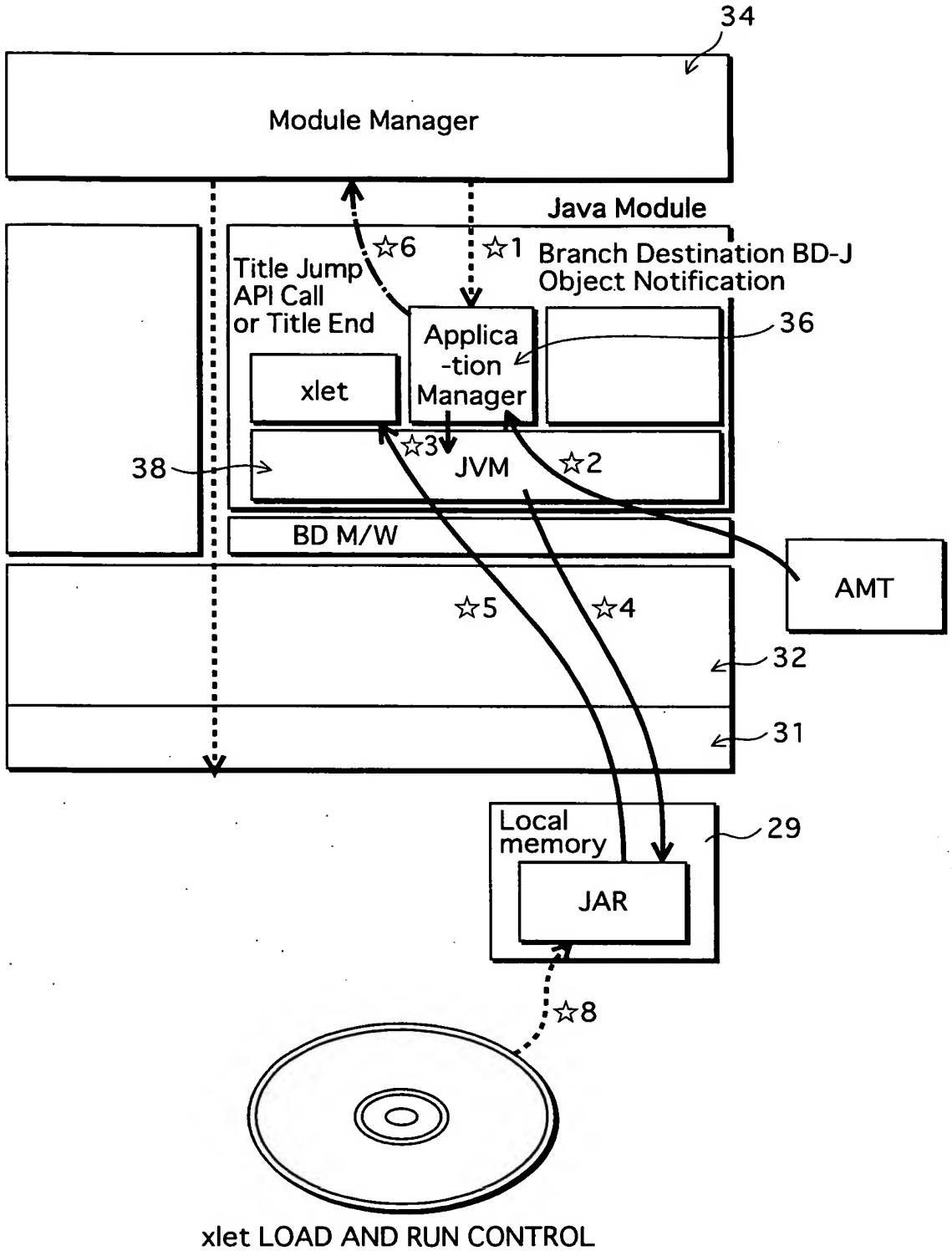

34
Module Manager
Java Module
☆6
☆1
Branch Destination BD-J Object Notification
Title Jump API Call or Title End
Applica -tion Manager
36
xlet
☆3
JVM
☆2
38
BD M/W
AMT
☆5
☆4
32
31
Local memory
29
JAR
☆8
xlet LOAD AND RUN CONTROL

FIG. 21

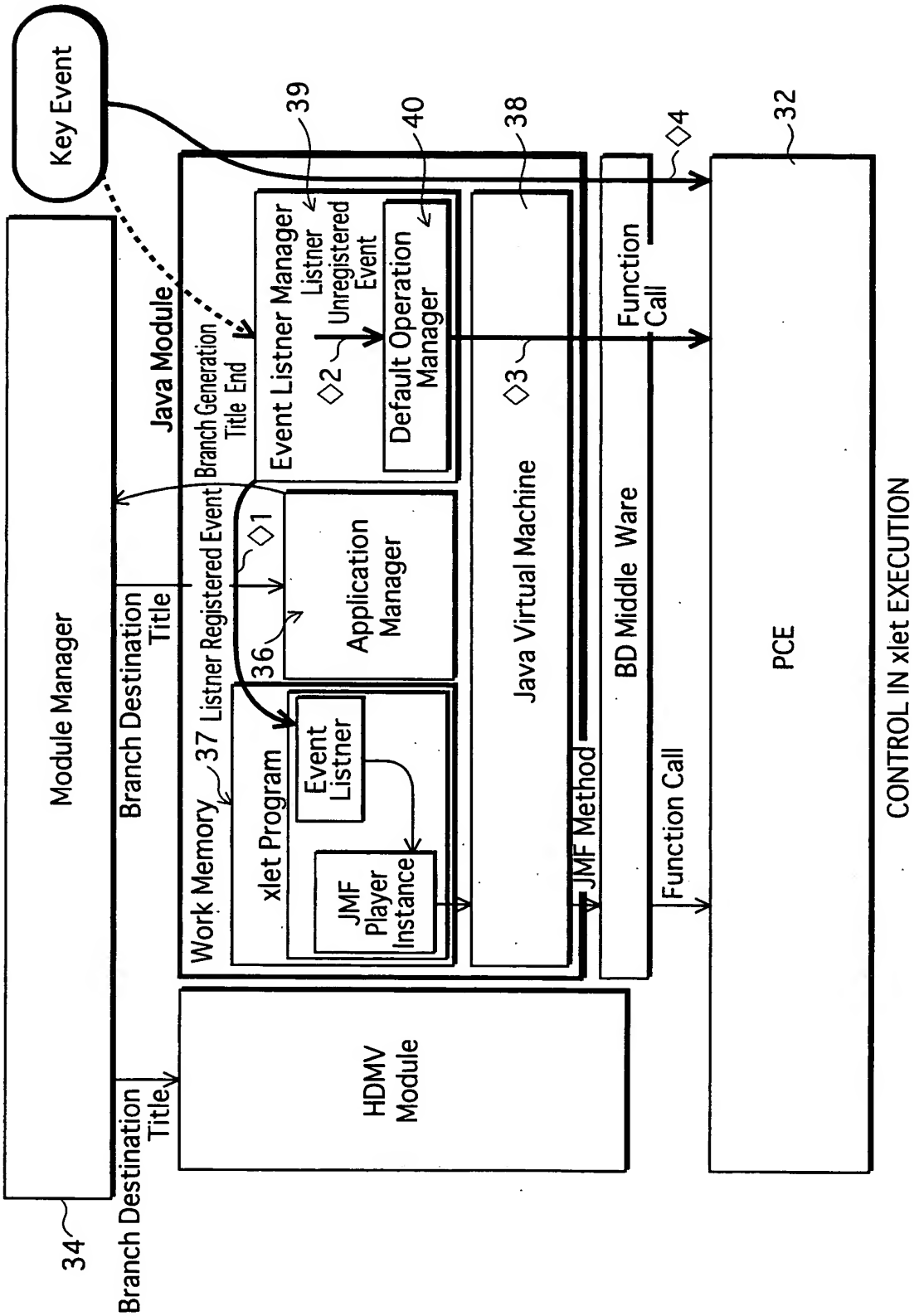

Key Event
Module Manager
Java Module
Branch Destination Title
Branch Generation Title End
Listner Registered Event
Work Memory
xlet Program
Event Listner
JMF Player Instance
Application Manager
Event Listner Manager
Listner Unregistered Event
Default Operation Manager
Java Virtual Machine
JMF Method
BD Middle Ware
Function Call
PCE
HDMV Module
CONTROL IN xlet EXECUTION
34
36
37
38
39
40
32
◇1
◇2
◇3
◇4

FIG. 22

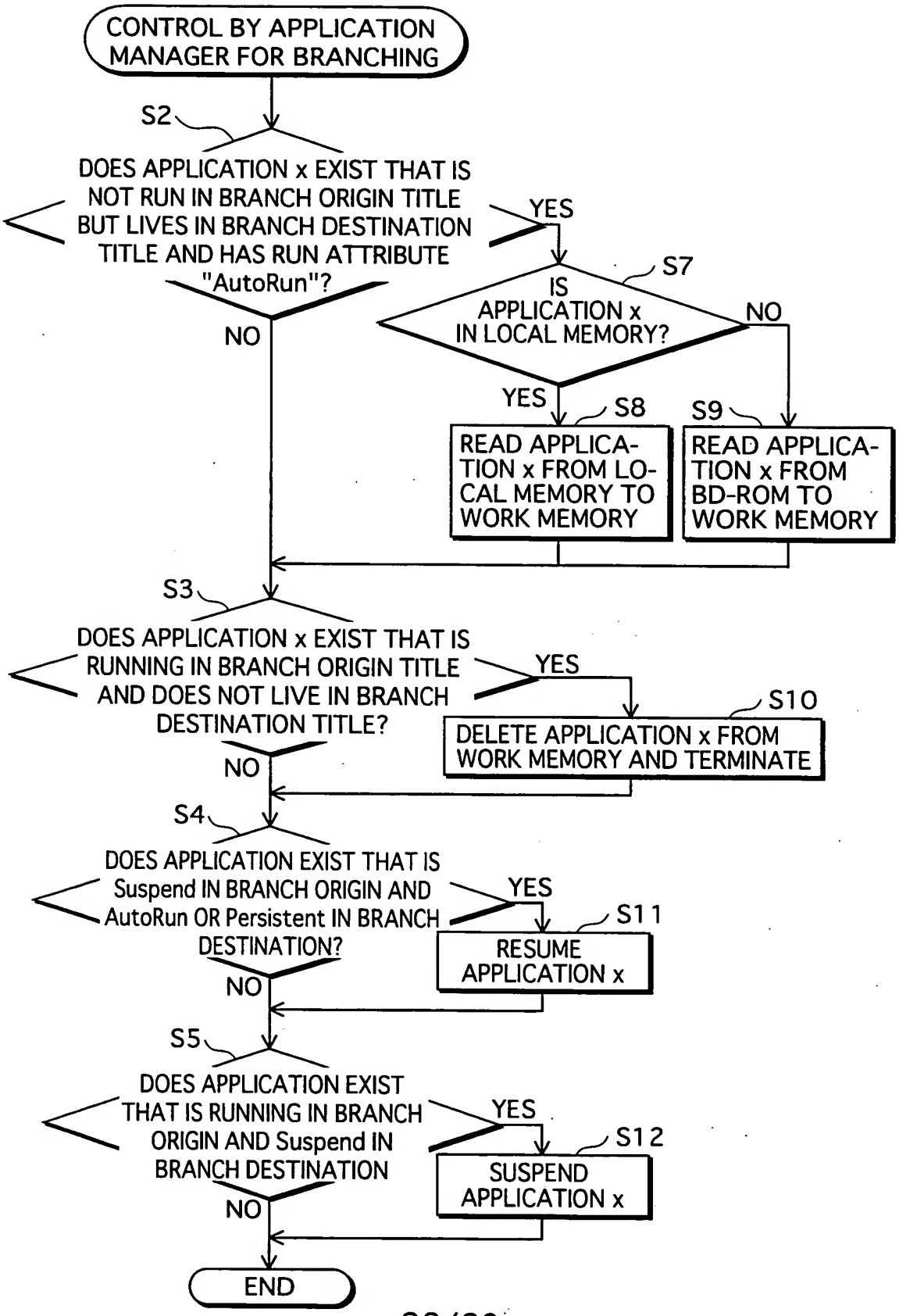

CONTROL BY APPLICATION MANAGER FOR BRANCHING
S2
DOES APPLICATION x EXIST THAT IS NOT RUN IN BRANCH ORIGIN TITLE BUT LIVES IN BRANCH DESTINATION TITLE AND HAS RUN ATTRIBUTE "AutoRun"?
YES
NO
S7
IS APPLICATION x IN LOCAL MEMORY?
NO
YES
S8
READ APPLICATION x FROM LOCAL MEMORY TO WORK MEMORY
S9
READ APPLICATION x FROM BD-ROM TO WORK MEMORY
S3
DOES APPLICATION x EXIST THAT IS RUNNING IN BRANCH ORIGIN TITLE AND DOES NOT LIVE IN BRANCH DESTINATION TITLE?
YES
S10
DELETE APPLICATION x FROM WORK MEMORY AND TERMINATE
NO
S4
DOES APPLICATION EXIST THAT IS Suspend IN BRANCH ORIGIN AND AutoRun OR Persistent IN BRANCH DESTINATION?
YES
S11
RESUME APPLICATION x
NO
S5
DOES APPLICATION EXIST THAT IS RUNNING IN BRANCH ORIGIN AND Suspend IN BRANCH DESTINATION
YES
S12
SUSPEND APPLICATION x
NO
END

FIG. 23

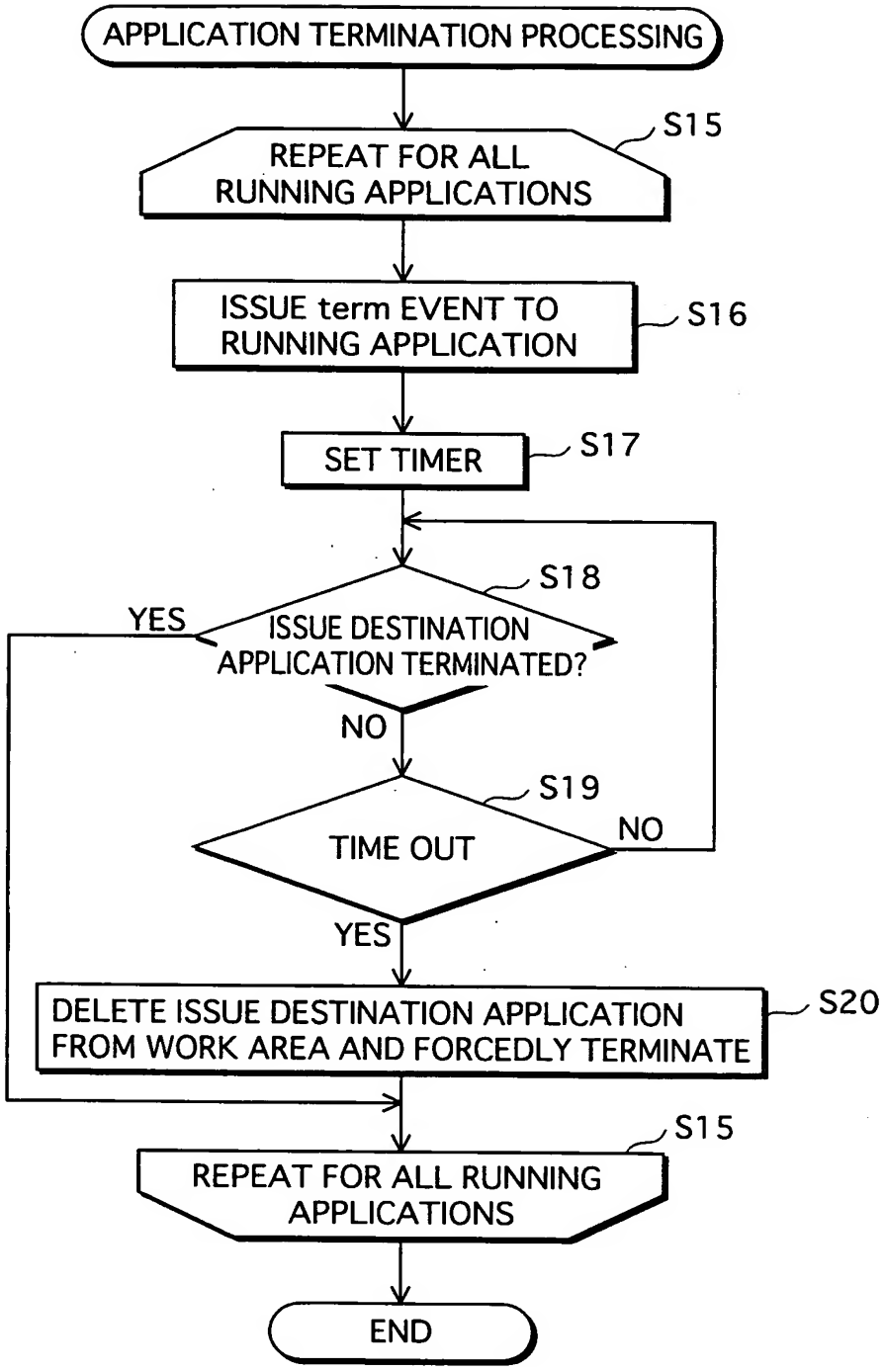

APPLICATION TERMINATION PROCESSING
S15
REPEAT FOR ALL RUNNING APPLICATIONS
ISSUE term EVENT TO RUNNING APPLICATION
S16
SET TIMER
S17
S18
YES
ISSUE DESTINATION APPLICATION TERMINATED?
NO
S19
TIME OUT
NO
YES
DELETE ISSUE DESTINATION APPLICATION FROM WORK AREA AND FORCEDLY TERMINATE
S20
S15
REPEAT FOR ALL RUNNING APPLICATIONS
END

FIG. 24

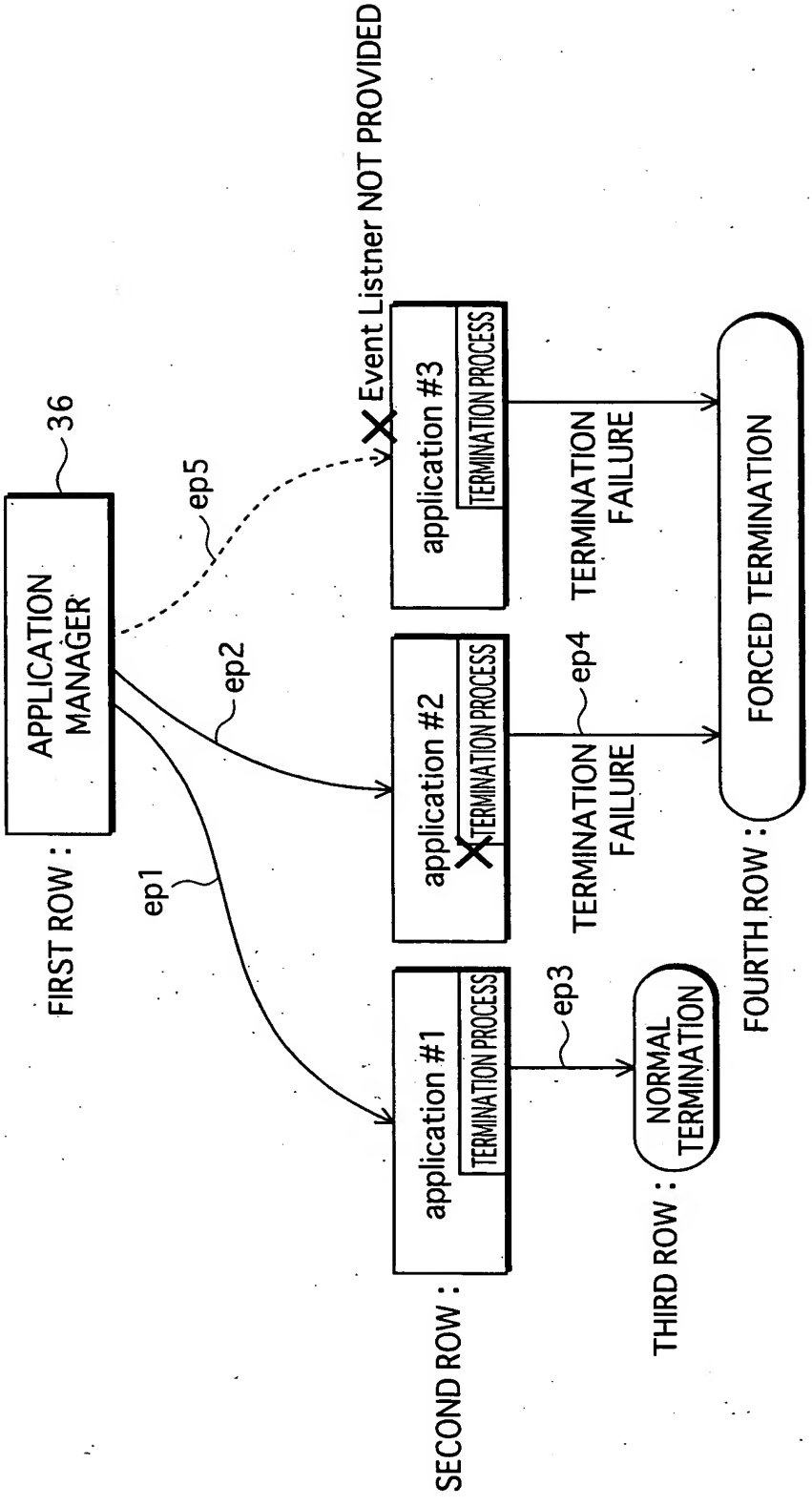

APPLICATION MANAGER
36
FIRST ROW :
ep1
ep2
ep5
Event Listner NOT PROVIDED
application #1
TERMINATION PROCESS
SECOND ROW :
ep3
NORMAL TERMINATION
THIRD ROW :
application #2
TERMINATION PROCESS
ep4
TERMINATION FAILURE
application #3
TERMINATION PROCESS
TERMINATION FAILURE
FORCED TERMINATION
FOURTH ROW :

FIG. 25A

APPLICATION MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE	RUN PRIORITY LEVEL
title #1	application #1	AutoRun	255
title #1 : chapter #2-#3	application #2	AutoRun	128
title #1 : chapter #4-#6	application #3	AutoRun	128

FIG. 25B

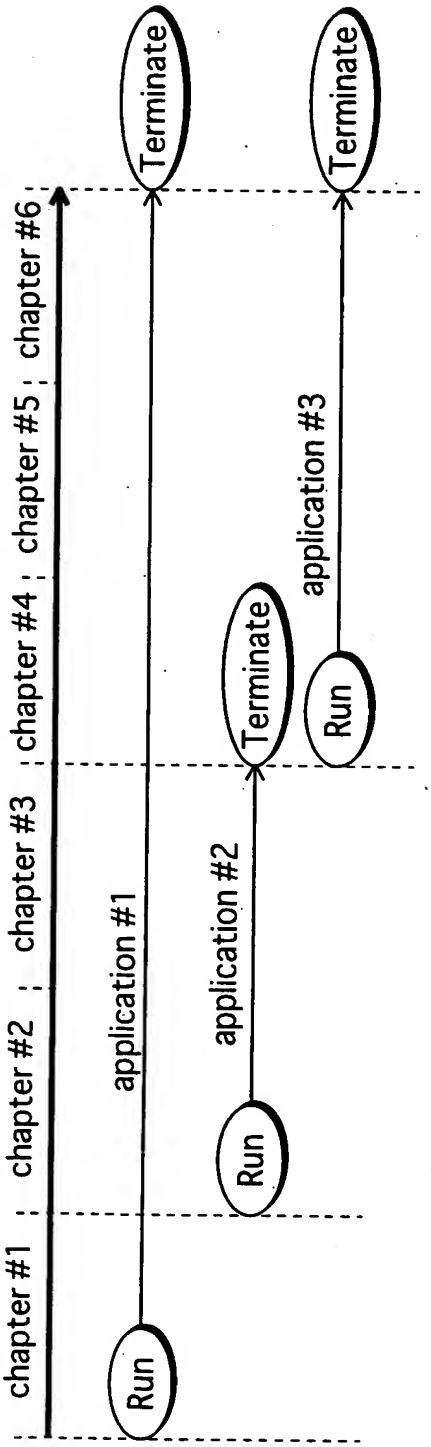


FIG. 26A

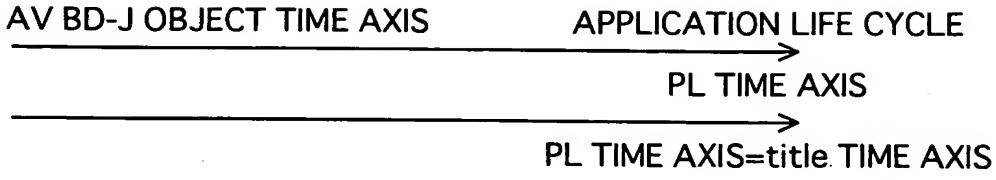


FIG. 26B

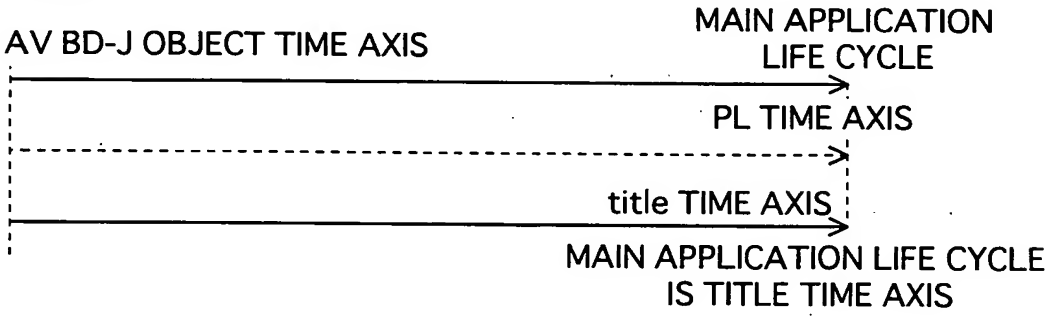


FIG. 26C

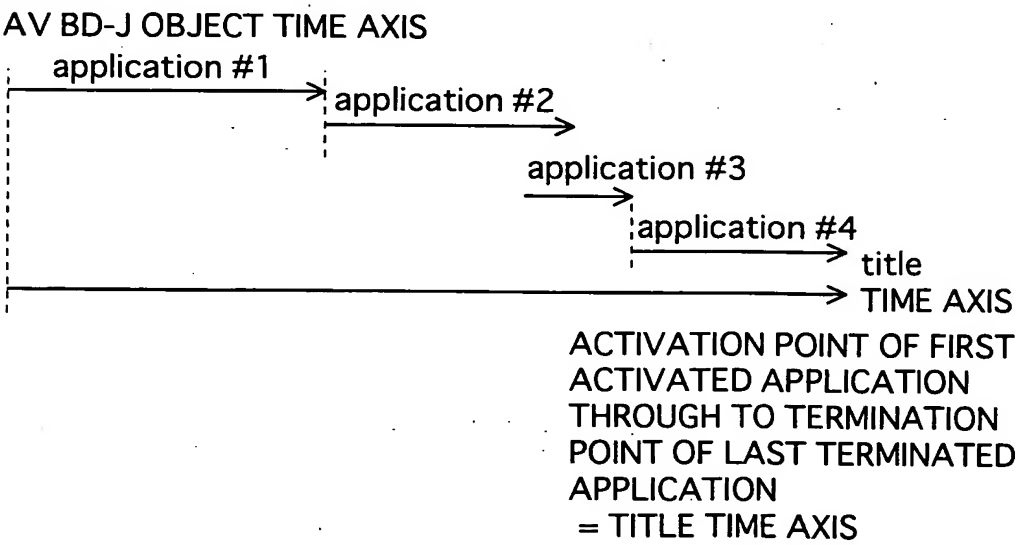


FIG. 27

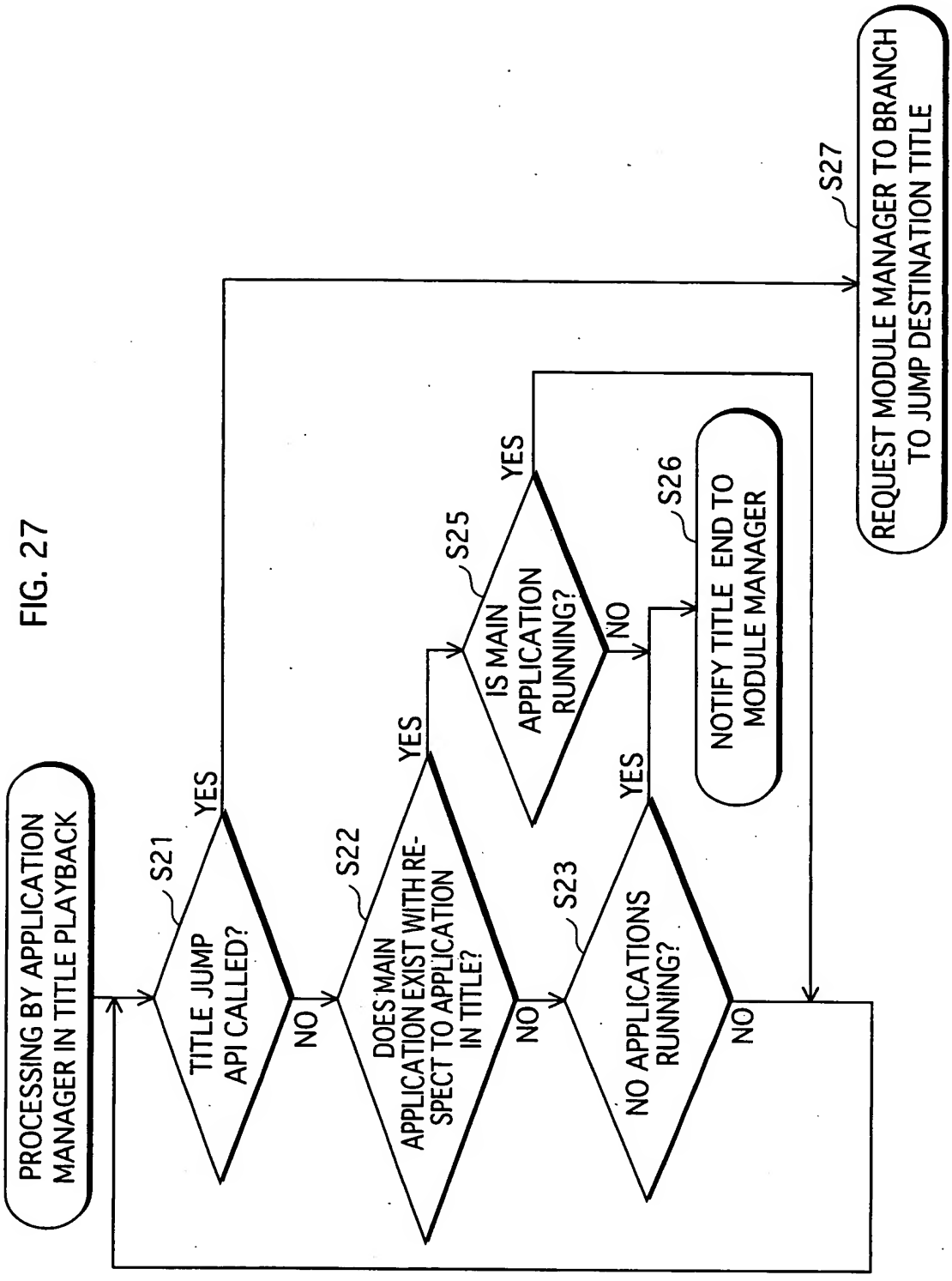

PROCESSING BY APPLICATION MANAGER IN TITLE PLAYBACK
S21
TITLE JUMP API CALLED?
YES
NO
S22
DOES MAIN APPLICATION EXIST WITH RESPECT TO APPLICATION IN TITLE?
YES
NO
S23
NO APPLICATIONS RUNNING?
YES
NO
S25
IS MAIN APPLICATION RUNNING?
YES
NO
S26
NOTIFY TITLE END TO MODULE MANAGER
S27
REQUEST MODULE MANAGER TO BRANCH TO JUMP DESTINATION TITLE

FIG. 28A

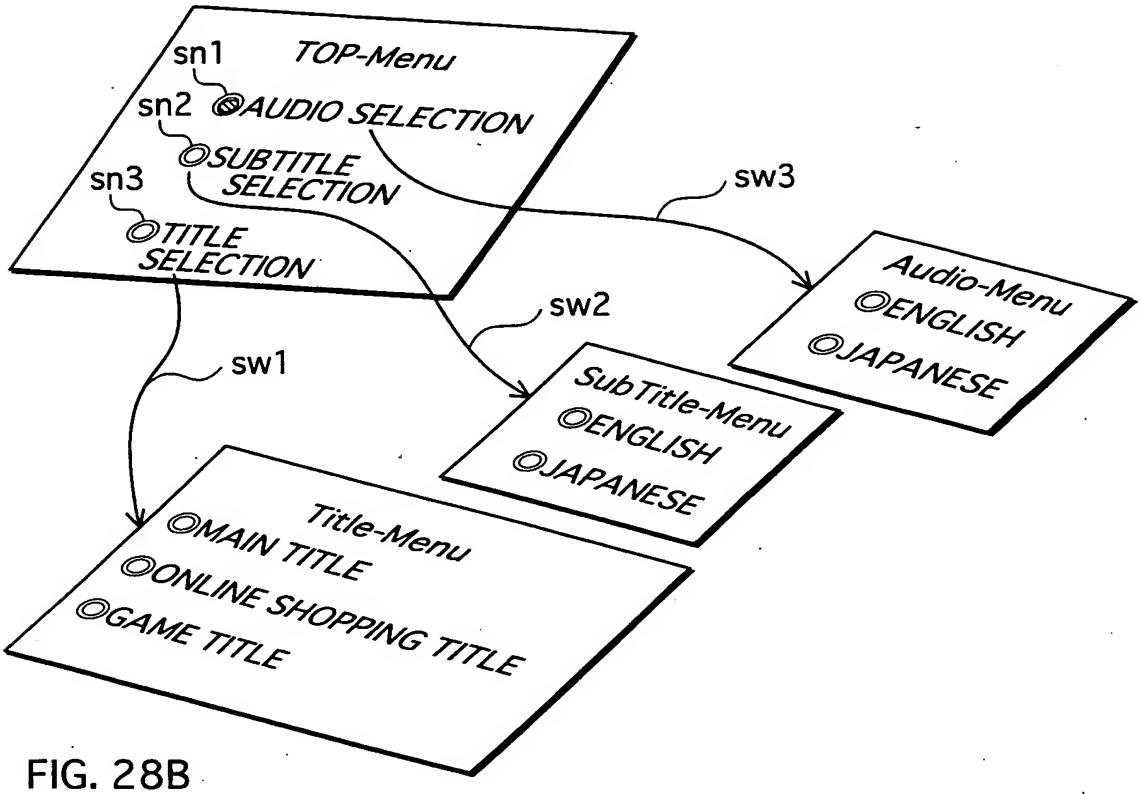


FIG. 28B

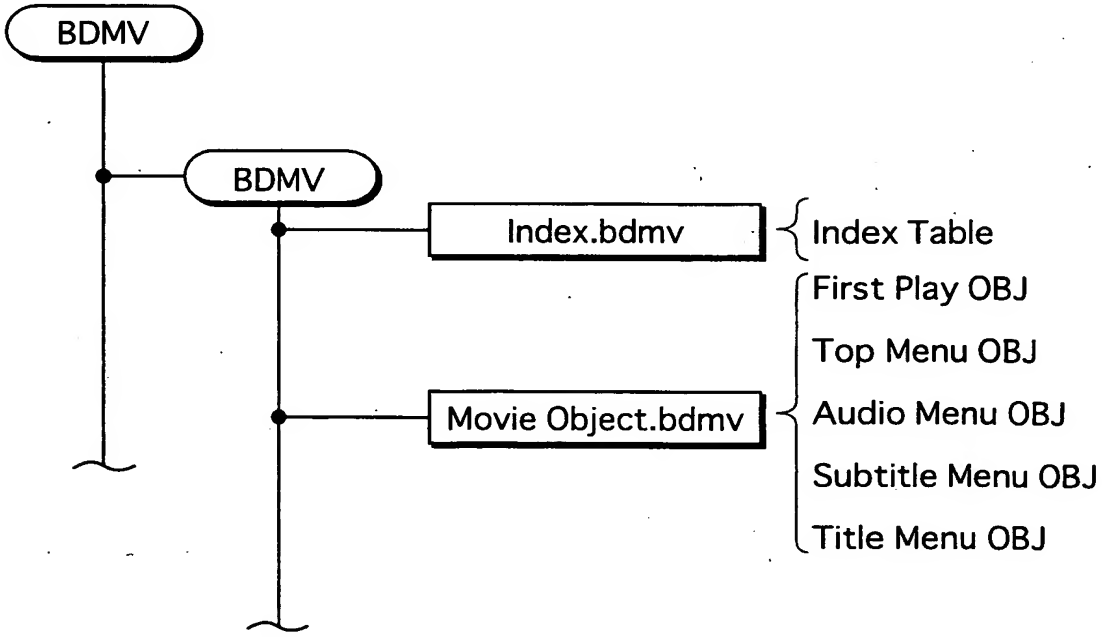


FIG. 29

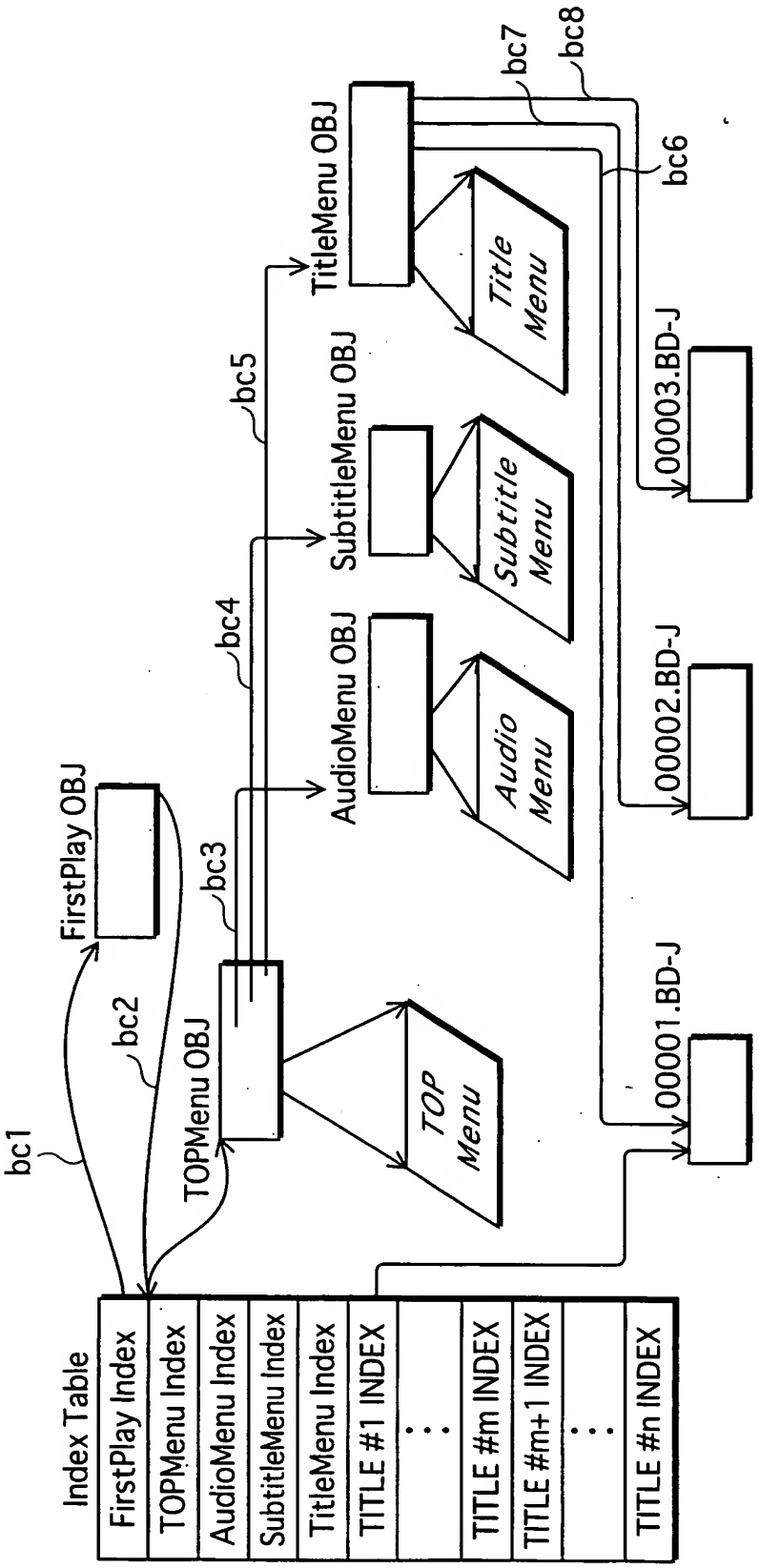

Index Table
FirstPlay Index
TOPMenu Index
AudioMenu Index
SubtitleMenu Index
TitleMenu Index
TITLE #1 INDEX
TITLE #m INDEX
TITLE #m+1 INDEX
TITLE #n INDEX
bc1
bc2
bc3
bc4
bc5
bc6
bc7
bc8
FirstPlay OBJ
TOPMenu OBJ
AudioMenu OBJ
SubtitleMenu OBJ
TitleMenu OBJ
TOP Menu
Audio Menu
Subtitle Menu
Title Menu
00001.BD-J
00002.BD-J
00003.BD-J

FIG. 30A

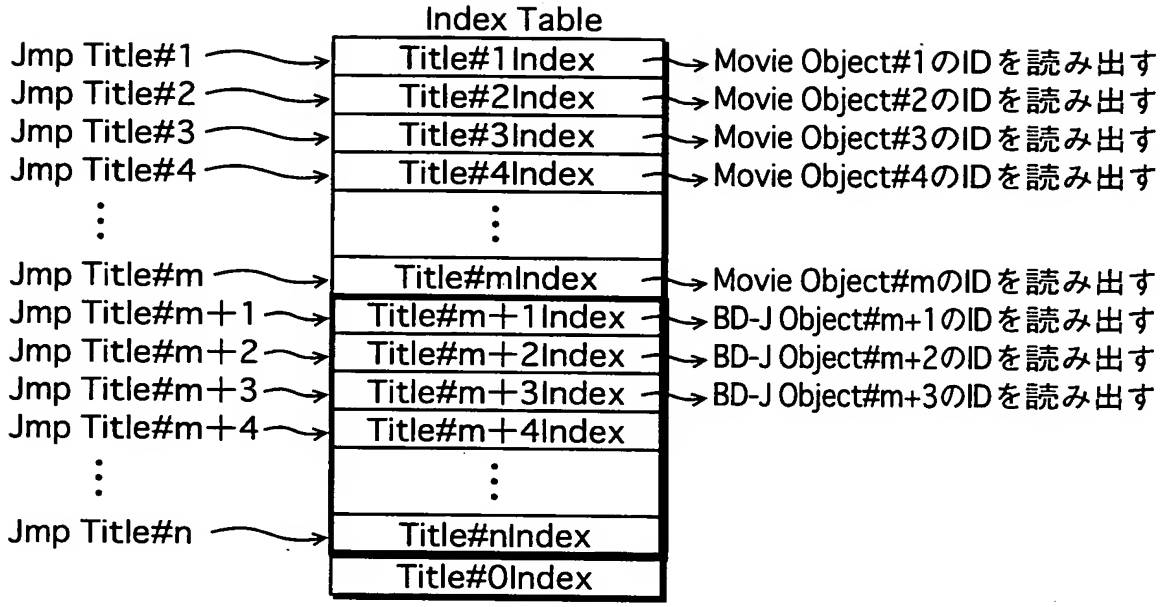


FIG. 30B

EXCEPTIONAL PROCESSING IN BD-J OBJECT EXECUTION

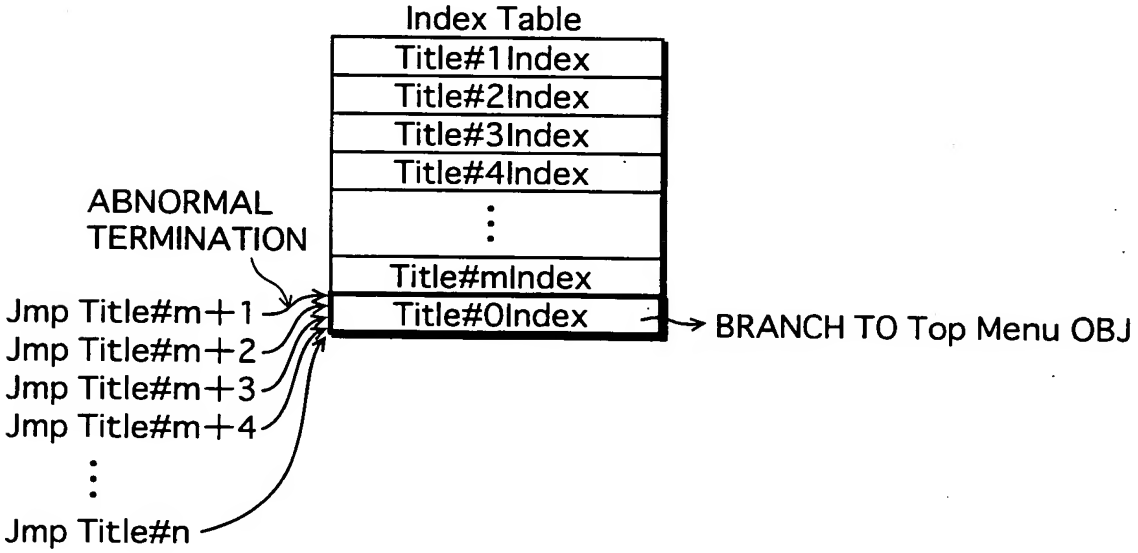


FIG. 31

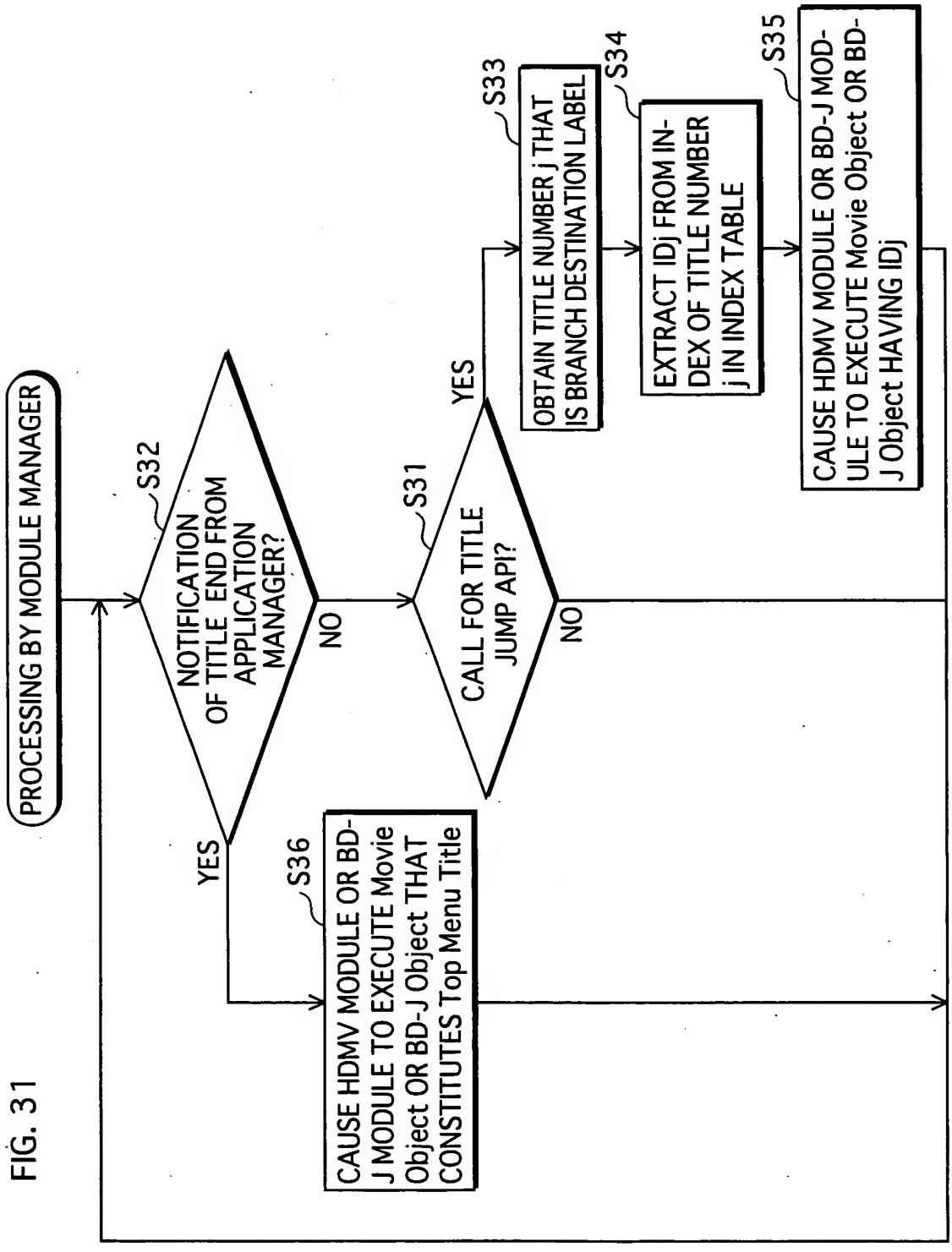

PROCESSING BY MODULE MANAGER
S32
NOTIFICATION OF TITLE END FROM APPLICATION MANAGER?
YES
NO
S36
CAUSE HDMV MODULE OR BD-J MODULE TO EXECUTE Movie Object OR BD-J Object THAT CONSTITUTES Top Menu Title
S31
CALL FOR TITLE JUMP API?
YES
NO
S33
OBTAIN TITLE NUMBER j THAT IS BRANCH DESTINATION LABEL
S34
EXTRACT IDj FROM INDEX OF TITLE NUMBER j IN INDEX TABLE
S35
CAUSE HDMV MODULE OR BD-J MODULE TO EXECUTE Movie Object OR BD-J Object HAVING IDj

FIG. 32

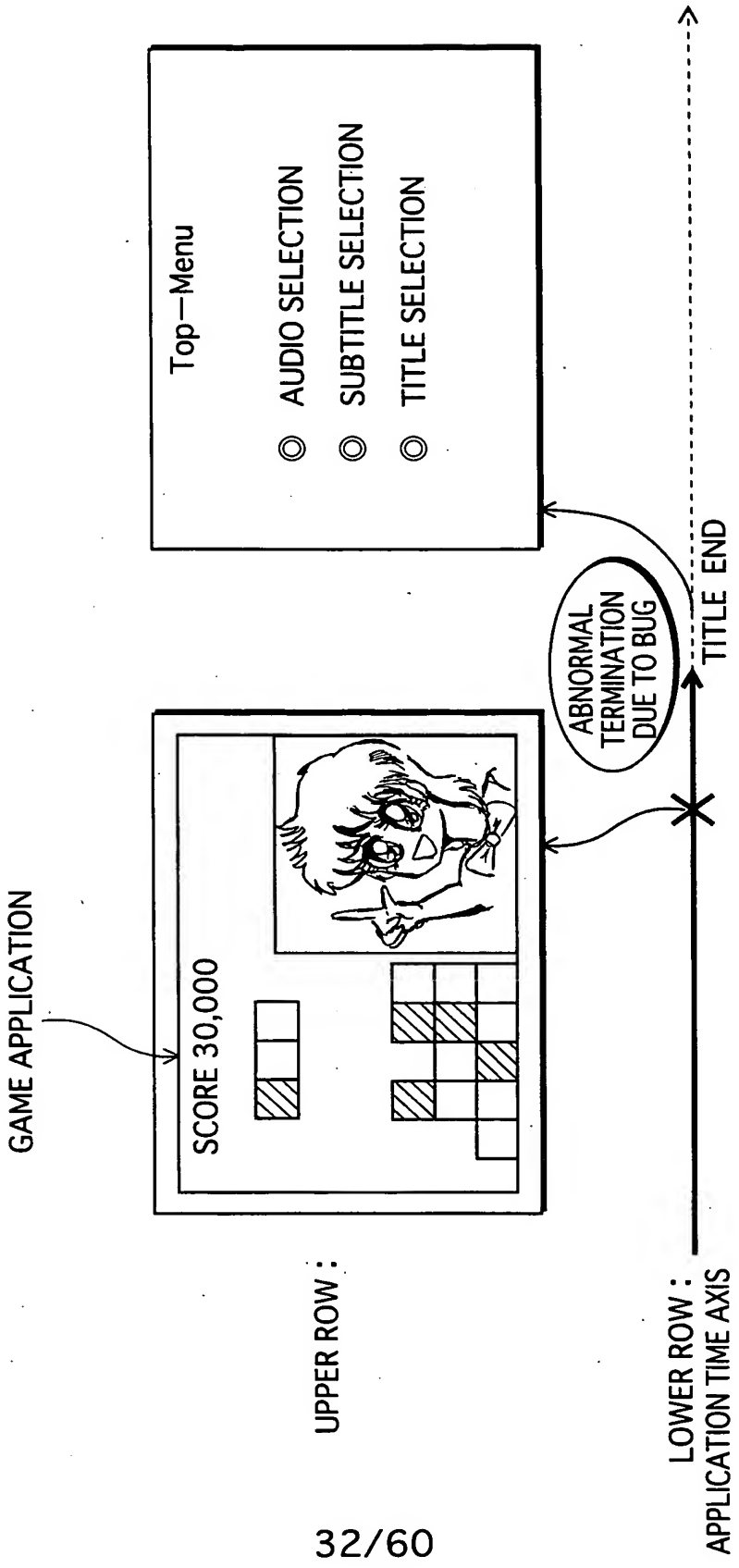

GAME APPLICATION
SCORE 30,000
UPPER ROW :
LOWER ROW :
APPLICATION TIME AXIS
ABNORMAL TERMINATION DUE TO BUG
TITLE END
Top—Menu
◎ AUDIO SELECTION
◎ SUBTITLE SELECTION
◎ TITLE SELECTION

FIG. 33

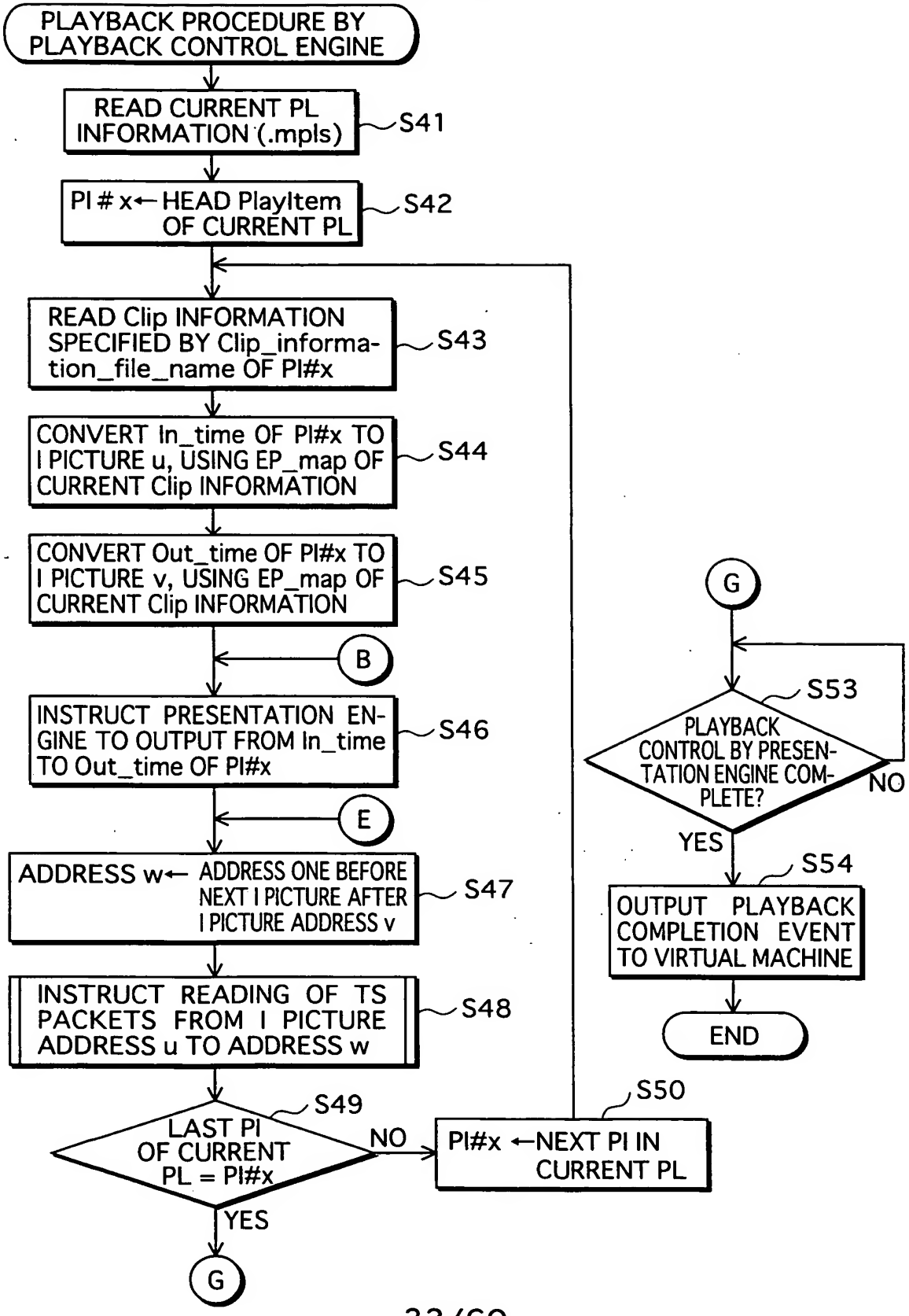

PLAYBACK PROCEDURE BY PLAYBACK CONTROL ENGINE
READ CURRENT PL INFORMATION (.mpls)
S41
PI # x← HEAD PlayItem OF CURRENT PL
S42
READ Clip INFORMATION SPECIFIED BY Clip_information_file_name OF PI#x
S43
CONVERT In_time OF PI#x TO I PICTURE u, USING EP_map OF CURRENT Clip INFORMATION
S44
CONVERT Out_time OF PI#x TO I PICTURE v, USING EP_map OF CURRENT Clip INFORMATION
S45
B
INSTRUCT PRESENTATION ENGINE TO OUTPUT FROM In_time TO Out_time OF PI#x
S46
E
ADDRESS w← ADDRESS ONE BEFORE NEXT I PICTURE AFTER I PICTURE ADDRESS v
S47
INSTRUCT READING OF TS PACKETS FROM I PICTURE ADDRESS u TO ADDRESS w
S48
LAST PI OF CURRENT PL = PI#x
S49
NO
YES
PI#x ←NEXT PI IN CURRENT PL
S50
G
G
PLAYBACK CONTROL BY PRESENTATION ENGINE COMPLETE?
S53
NO
YES
OUTPUT PLAYBACK COMPLETION EVENT TO VIRTUAL MACHINE
S54
END

FIG. 34

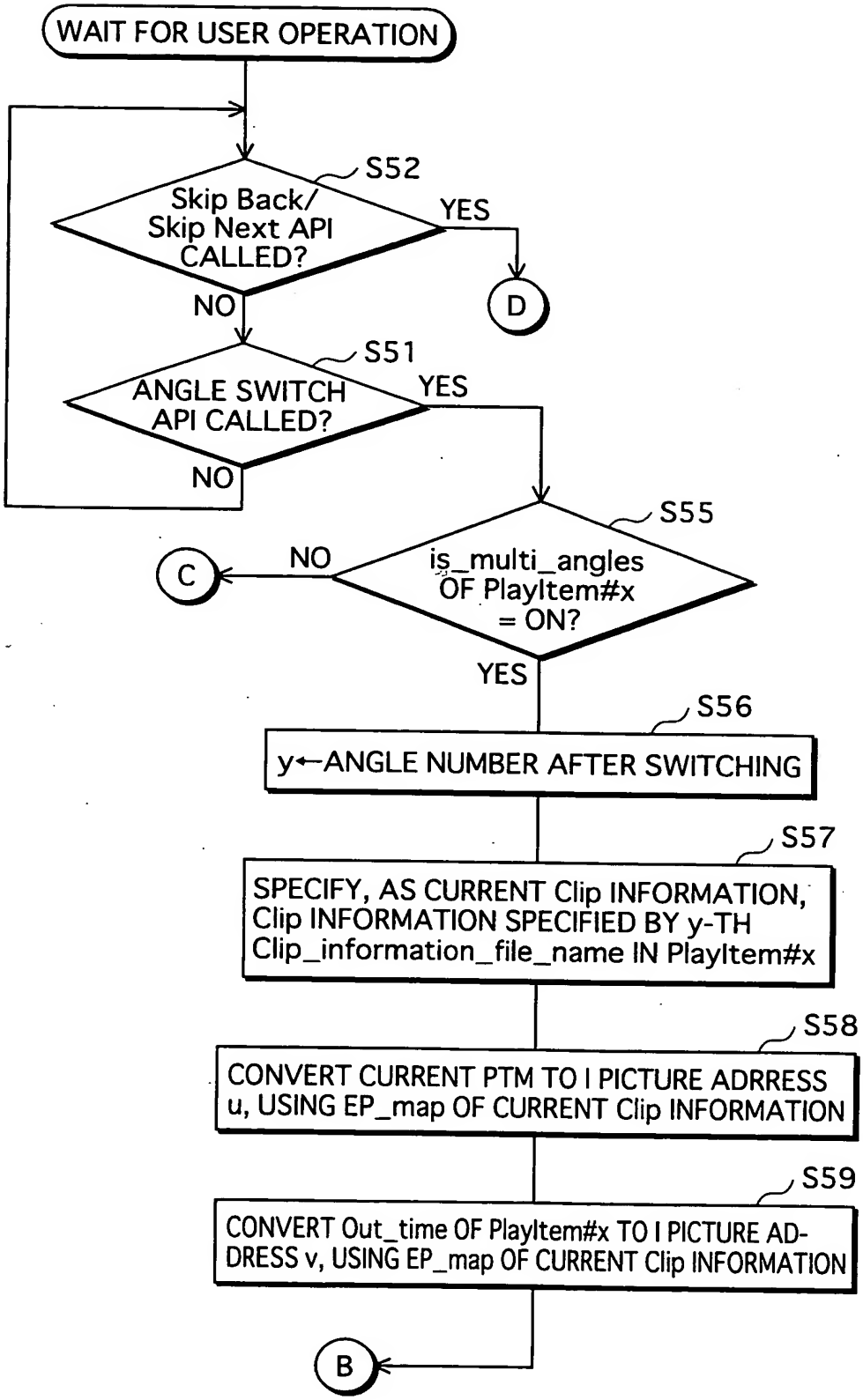

WAIT FOR USER OPERATION
S52
Skip Back/ Skip Next API CALLED?
YES
D
NO
S51
ANGLE SWITCH API CALLED?
YES
NO
S55
is_multi_angles OF PlayItem#x = ON?
NO
C
YES
S56
y←ANGLE NUMBER AFTER SWITCHING
S57
SPECIFY, AS CURRENT Clip INFORMATION, Clip INFORMATION SPECIFIED BY y-TH Clip_information_file_name IN PlayItem#x
S58
CONVERT CURRENT PTM TO I PICTURE ADRRESS u, USING EP_map OF CURRENT Clip INFORMATION
S59
CONVERT Out_time OF PlayItem#x TO I PICTURE ADDRESS v, USING EP_map OF CURRENT Clip INFORMATION
B

FIG. 35

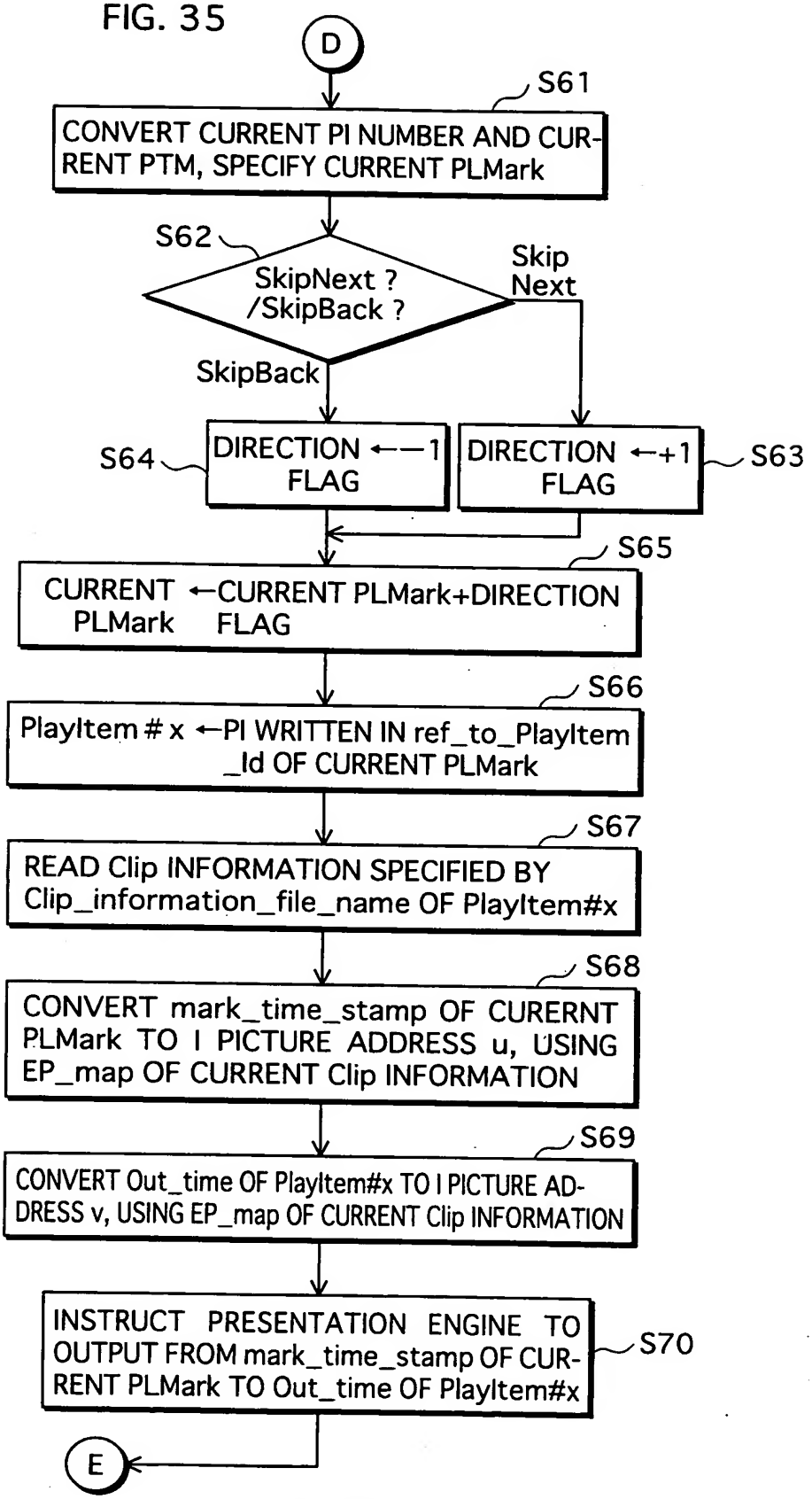

D
S61
CONVERT CURRENT PI NUMBER AND CURRENT PTM, SPECIFY CURRENT PLMark
S62
SkipNext ? /SkipBack ?
Skip Next
SkipBack
S64
DIRECTION FLAG ←−1
DIRECTION FLAG ←+1
S63
S65
CURRENT PLMark ←CURRENT PLMark+DIRECTION FLAG
S66
PlayItem # x ←PI WRITTEN IN ref_to_PlayItem _Id OF CURRENT PLMark
S67
READ Clip INFORMATION SPECIFIED BY Clip_information_file_name OF PlayItem#x
S68
CONVERT mark_time_stamp OF CURERNT PLMark TO I PICTURE ADDRESS u, USING EP_map OF CURRENT Clip INFORMATION
S69
CONVERT Out_time OF PlayItem#x TO I PICTURE ADDRESS v, USING EP_map OF CURRENT Clip INFORMATION
INSTRUCT PRESENTATION ENGINE TO OUTPUT FROM mark_time_stamp OF CURRENT PLMark TO Out_time OF PlayItem#x
S70
E

FIG. 36

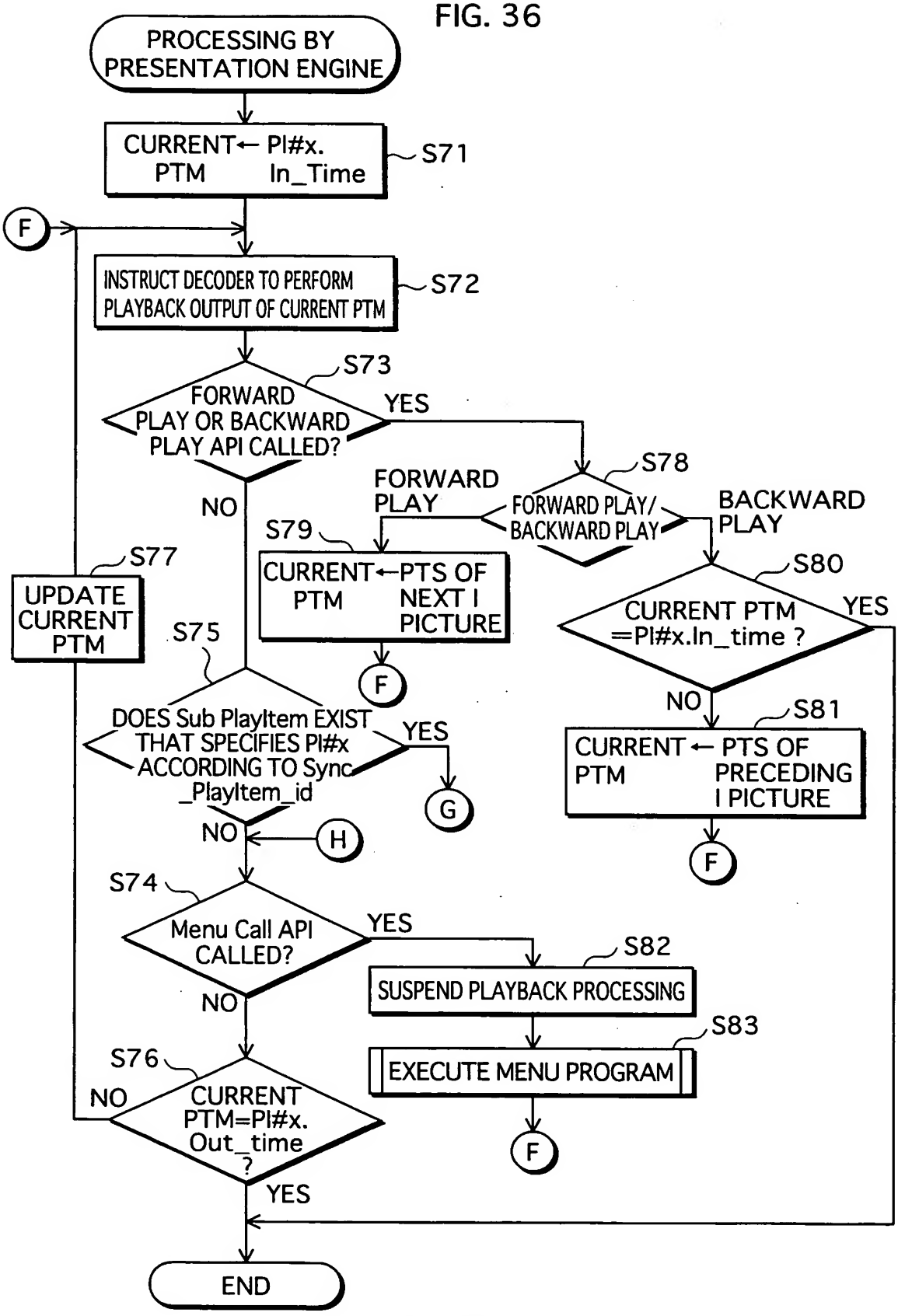

PROCESSING BY PRESENTATION ENGINE
CURRENT PTM ← PI#x. In_Time
S71
F
INSTRUCT DECODER TO PERFORM PLAYBACK OUTPUT OF CURRENT PTM
S72
S73
FORWARD PLAY OR BACKWARD PLAY API CALLED?
YES
NO
S78
FORWARD PLAY/ BACKWARD PLAY
FORWARD PLAY
BACKWARD PLAY
S79
CURRENT PTM ← PTS OF NEXT I PICTURE
S80
CURRENT PTM =PI#x.In_time ?
YES
NO
S81
CURRENT PTM ← PTS OF PRECEDING I PICTURE
F
F
S77
UPDATE CURRENT PTM
S75
DOES Sub PlayItem EXIST THAT SPECIFIES PI#x ACCORDING TO Sync _PlayItem_id
YES
G
NO
H
S74
Menu Call API CALLED?
YES
S82
SUSPEND PLAYBACK PROCESSING
S83
EXECUTE MENU PROGRAM
F
NO
S76
CURRENT PTM=PI#x. Out_time ?
NO
YES
END

FIG. 37

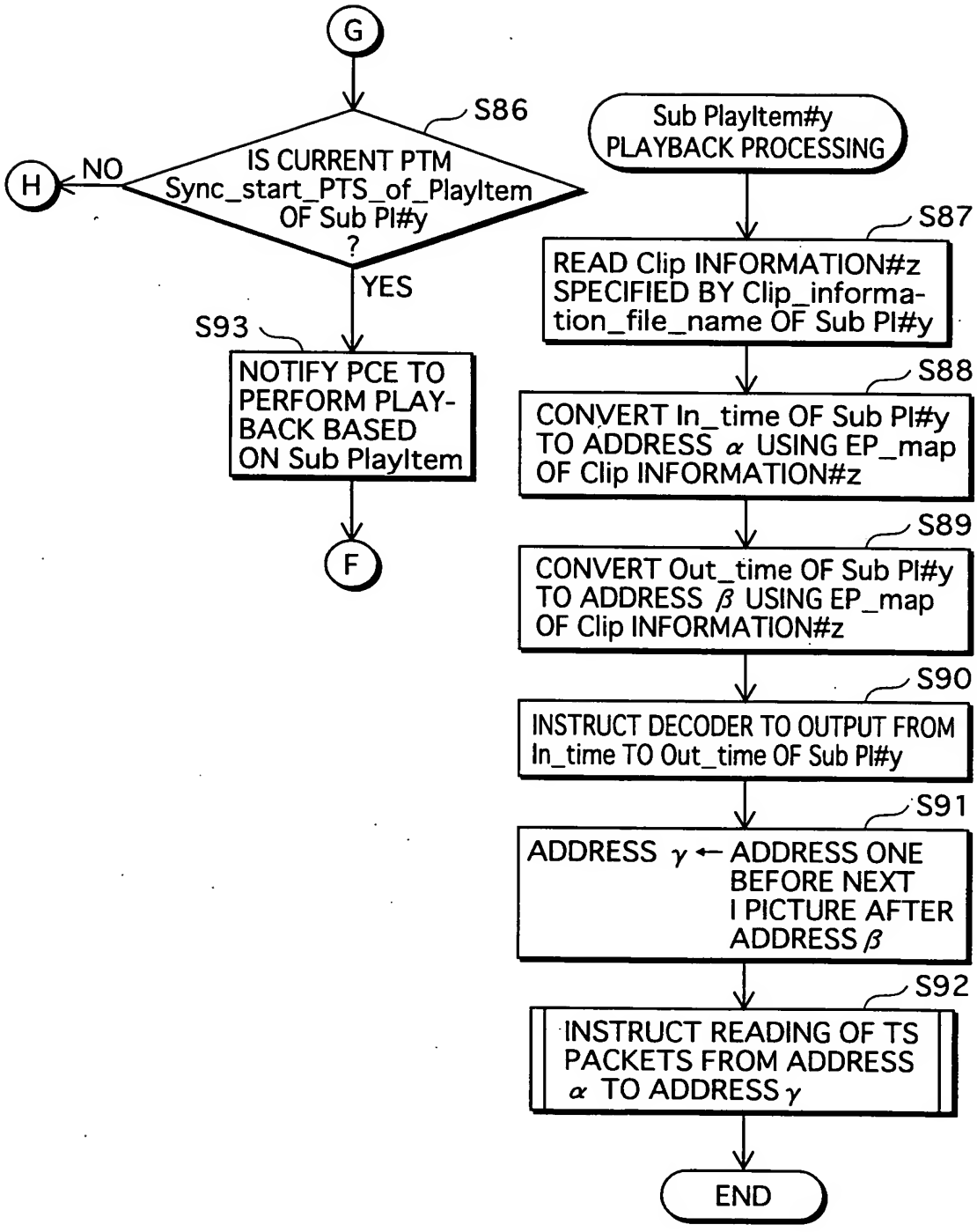

G
S86
IS CURRENT PTM Sync_start_PTS_of_PlayItem OF Sub PI#y ?
NO
H
YES
S93
NOTIFY PCE TO PERFORM PLAY-BACK BASED ON Sub PlayItem
F
Sub PlayItem#y PLAYBACK PROCESSING
S87
READ Clip INFORMATION#z SPECIFIED BY Clip_information_file_name OF Sub PI#y
S88
CONVERT In_time OF Sub PI#y TO ADDRESS α USING EP_map OF Clip INFORMATION#z
S89
CONVERT Out_time OF Sub PI#y TO ADDRESS β USING EP_map OF Clip INFORMATION#z
S90
INSTRUCT DECODER TO OUTPUT FROM In_time TO Out_time OF Sub PI#y
S91
ADDRESS γ ← ADDRESS ONE BEFORE NEXT I PICTURE AFTER ADDRESS β
S92
INSTRUCT READING OF TS PACKETS FROM ADDRESS α TO ADDRESS γ
END

FIG. 38

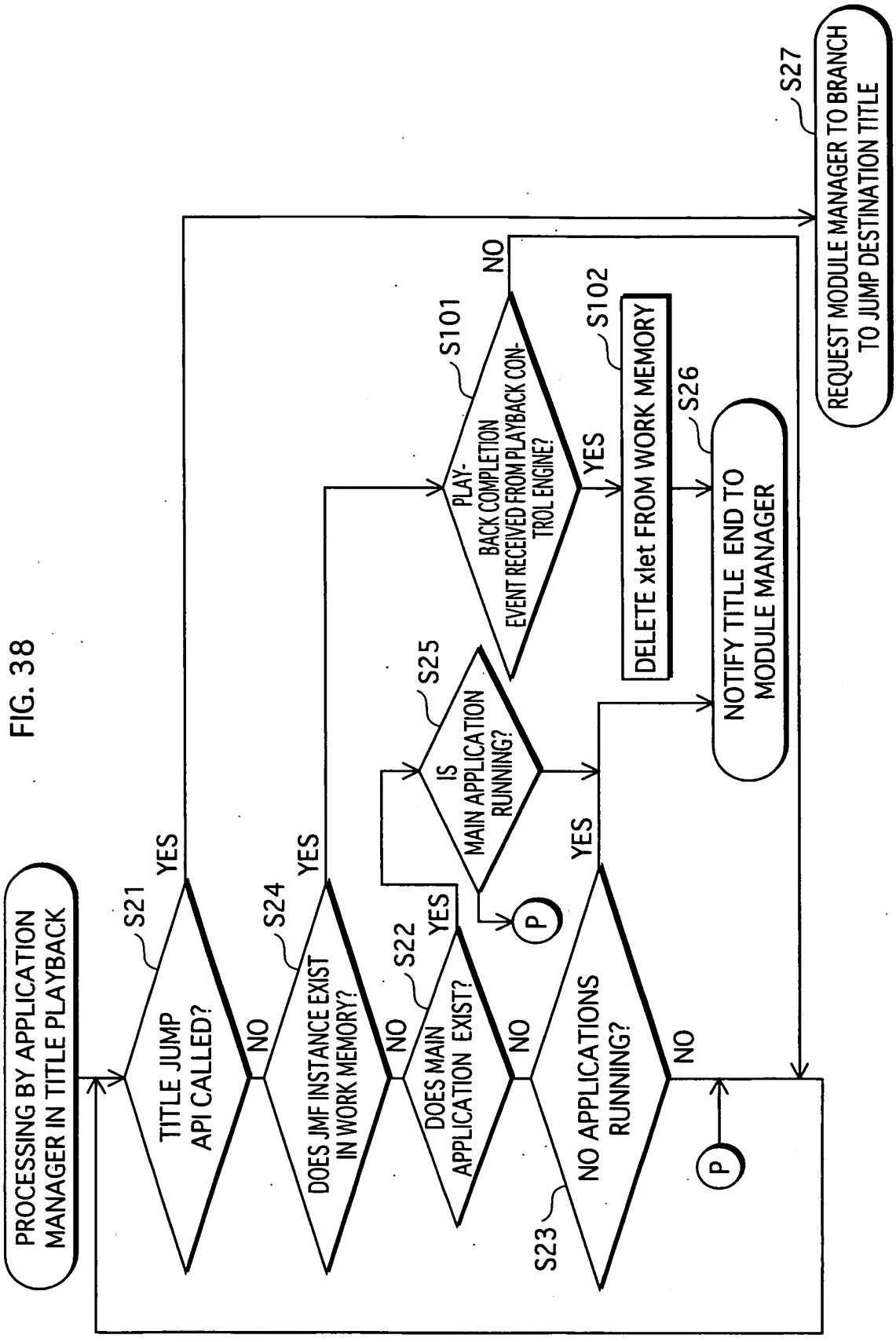

PROCESSING BY APPLICATION MANAGER IN TITLE PLAYBACK
S21
TITLE JUMP API CALLED?
YES
NO
S24
DOES JMF INSTANCE EXIST IN WORK MEMORY?
YES
NO
S22
DOES MAIN APPLICATION EXIST?
YES
NO
S23
NO APPLICATIONS RUNNING?
YES
NO
S25
IS MAIN APPLICATION RUNNING?
YES
NO
S101
PLAY-BACK COMPLETION EVENT RECEIVED FROM PLAYBACK CONTROL ENGINE?
YES
NO
S102
DELETE xlet FROM WORK MEMORY
S26
NOTIFY TITLE END TO MODULE MANAGER
S27
REQUEST MODULE MANAGER TO BRANCH TO JUMP DESTINATION TITLE
P
P

FIG. 39

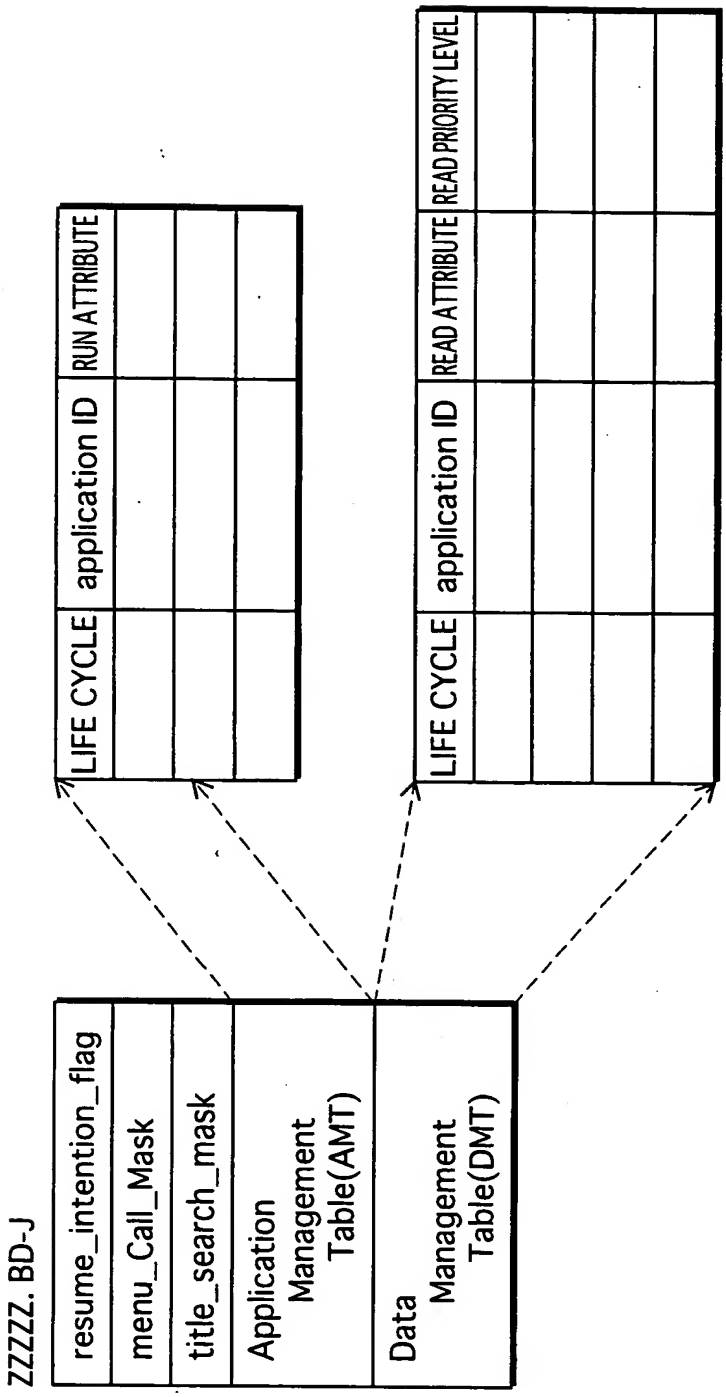

ZZZZZ. BD-J
resume_intention_flag
menu_Call_Mask
title_search_mask
Application Management Table(AMT)
Data Management Table(DMT)
LIFE CYCLE
application ID
RUN ATTRIBUTE
LIFE CYCLE
application ID
READ ATTRIBUTE
READ PRIORITY LEVEL

FIG. 40

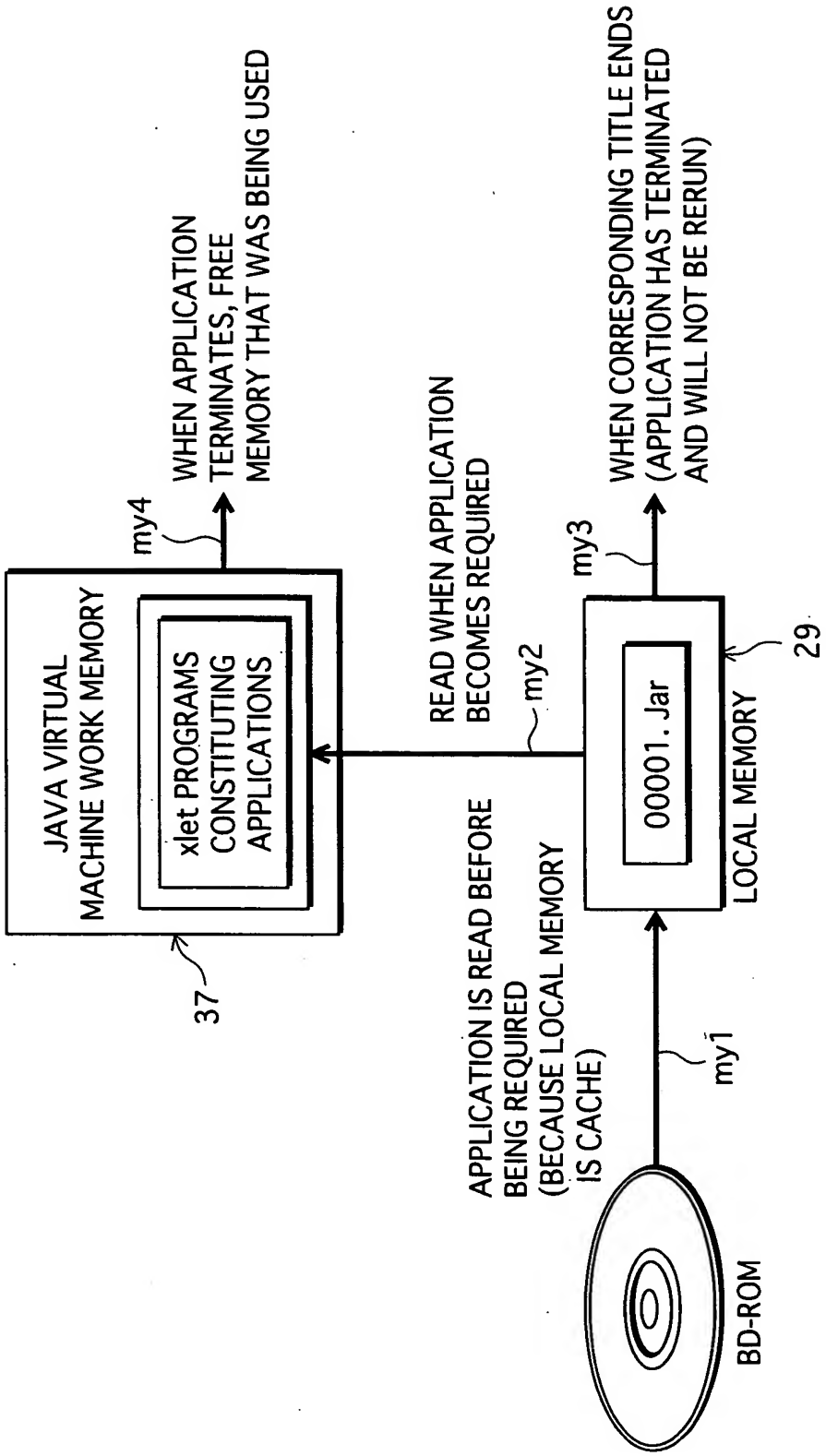

JAVA VIRTUAL MACHINE WORK MEMORY
xlet PROGRAMS CONSTITUTING APPLICATIONS
37
my4
WHEN APPLICATION TERMINATES, FREE MEMORY THAT WAS BEING USED
READ WHEN APPLICATION BECOMES REQUIRED
my2
my3
WHEN CORRESPONDING TITLE ENDS (APPLICATION HAS TERMINATED AND WILL NOT BE RERUN)
00001.Jar
LOCAL MEMORY
29
APPLICATION IS READ BEFORE BEING REQUIRED (BECAUSE LOCAL MEMORY IS CACHE)
my1
BD-ROM

FIG. 41A

title #1 DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	READ ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1		
title #1	application #2		

title #2 DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	READ ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1		
title #2	application #2		

FIG. 41B

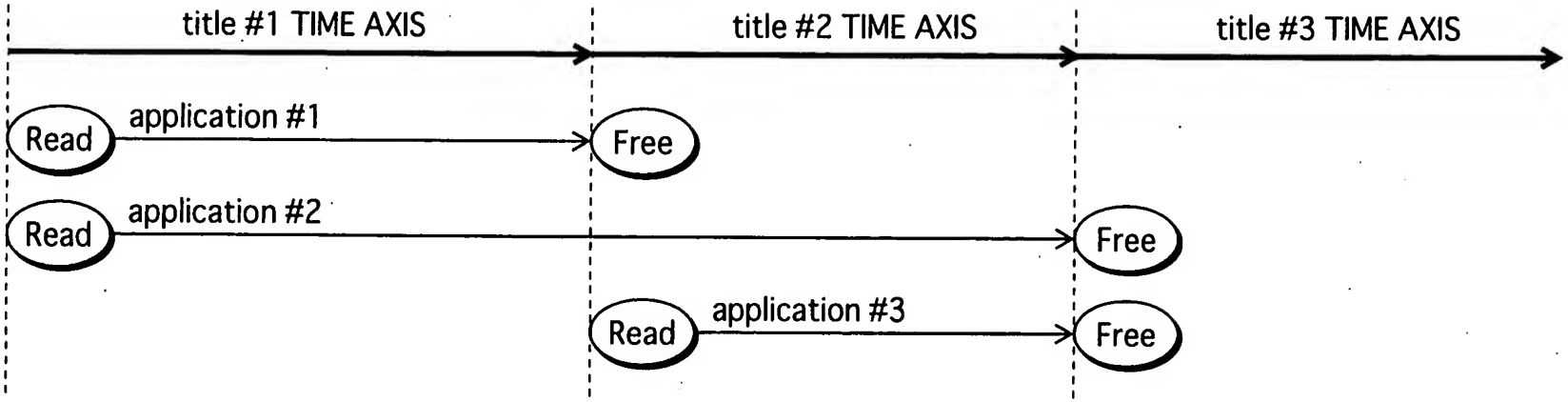


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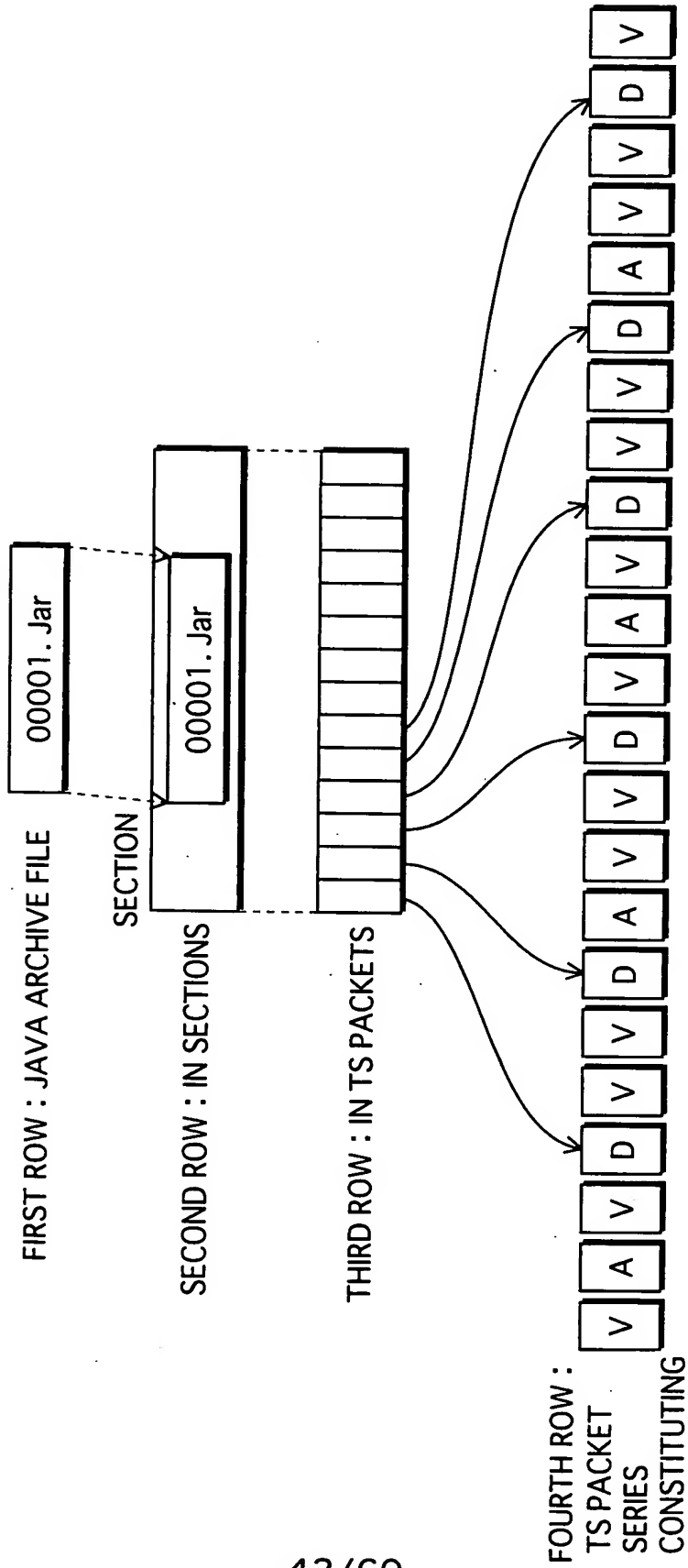
FIG. 42


FIRST ROW : JAVA ARCHIVE FILE
00001.Jar
SECTION
SECOND ROW : IN SECTIONS
00001.Jar
THIRD ROW : IN TS PACKETS
FOURTH ROW : TS PACKET SERIES CONSTITUTING AVClip
V
A
V
D

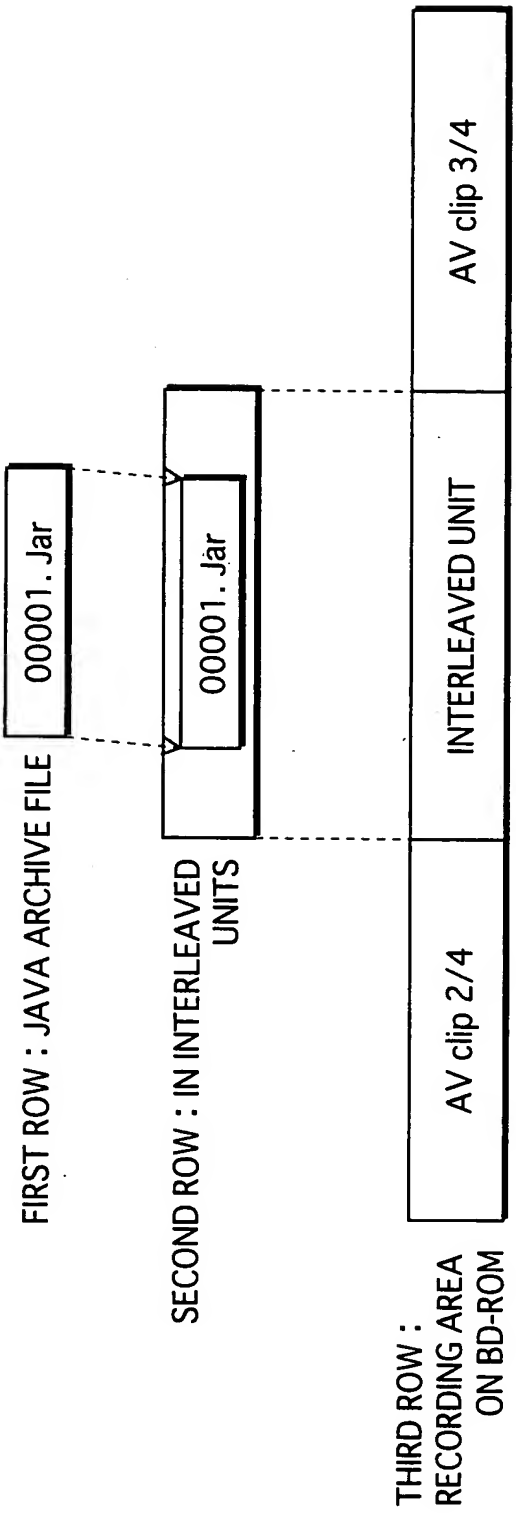


FIG. 43A

FIG. 43B

FIG. 44A title #1 DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	READ ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1	Preload	mandatory
title #1:chapter #1-#2	application #2	Load	optional
title #1:chapter #4-#5	application #3	Load	optional

FIG. 44B

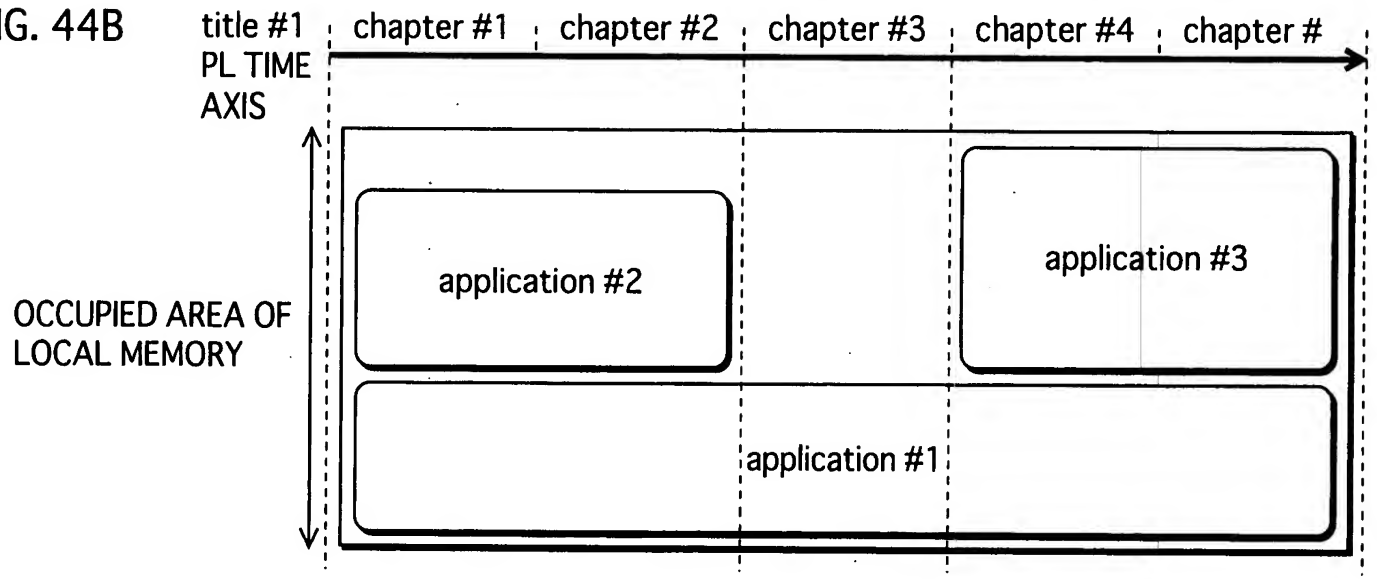


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FIG. 45A

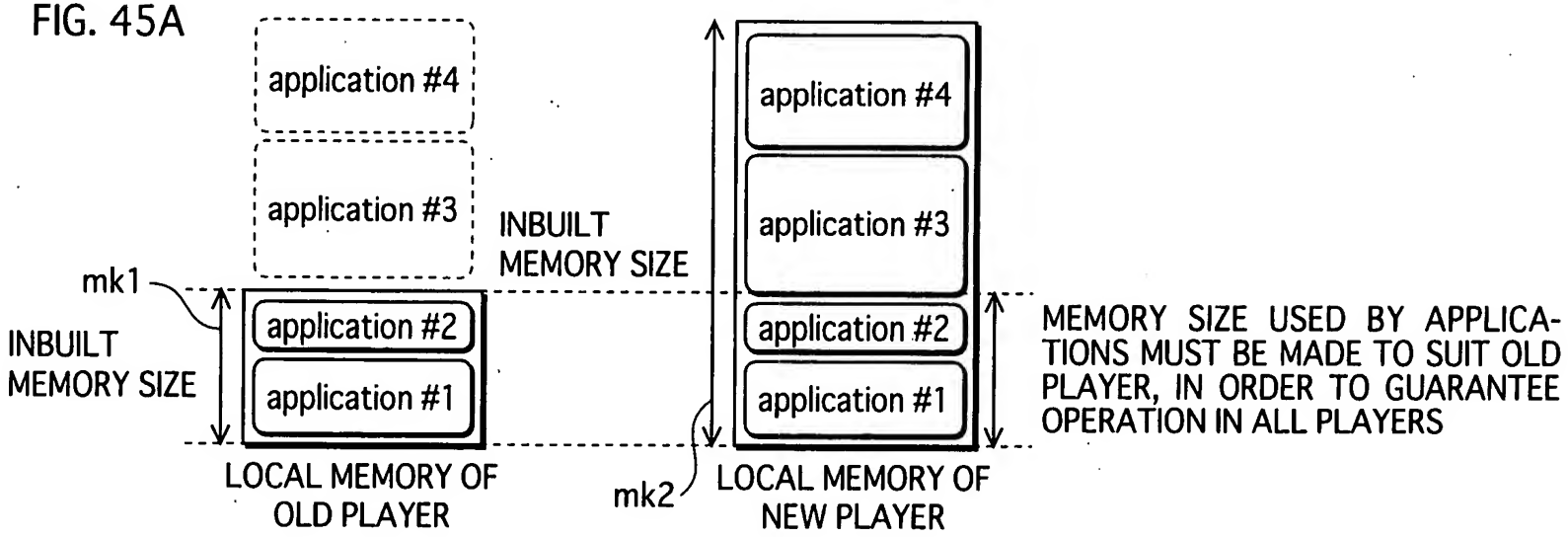

FIG. 45B

title #1 DATA MANAGEMENT TABLE

TITLE NUMBER	application ID	READ ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1	Preload	mandatory
title #1	application #2	Preload	mandatory
title #1	application #3	Preload	optional
title #1	application #4	Preload	optional

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FIG. 46

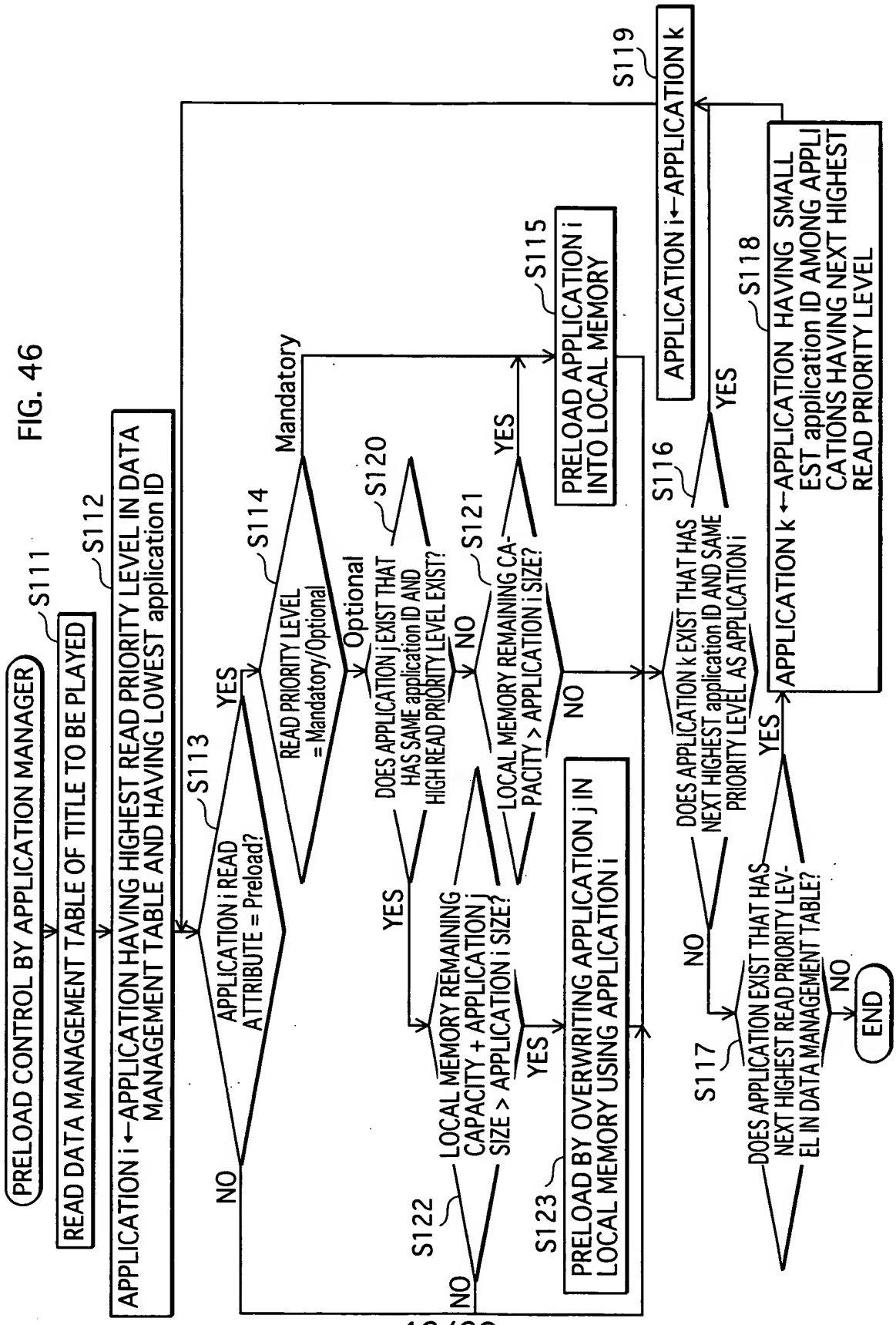
PRELOAD CONTROL BY APPLICATION MANAGER
S111
READ DATA MANAGEMENT TABLE OF TITLE TO BE PLAYED
S112
APPLICATION i ← APPLICATION HAVING HIGHEST READ PRIORITY LEVEL IN DATA MANAGEMENT TABLE AND HAVING LOWEST application ID
S113
APPLICATION i READ ATTRIBUTE = Preload?
YES
NO
S114
READ PRIORITY LEVEL = Mandatory/Optional
Mandatory
Optional
S115
PRELOAD APPLICATION i INTO LOCAL MEMORY
S116
DOES APPLICATION k EXIST THAT HAS NEXT HIGHEST application ID AND SAME PRIORITY LEVEL AS APPLICATION i
YES
NO
S117
DOES APPLICATION EXIST THAT HAS NEXT HIGHEST READ PRIORITY LEVEL IN DATA MANAGEMENT TABLE?
YES
NO
END
S118
APPLICATION k ← APPLICATION HAVING SMALLEST application ID AMONG APPLICATIONS HAVING NEXT HIGHEST READ PRIORITY LEVEL
S119
APPLICATION i ← APPLICATION k
S120
DOES APPLICATION j EXIST THAT HAS SAME application ID AND HIGH READ PRIORITY LEVEL EXIST?
YES
NO
S121
LOCAL MEMORY REMAINING CAPACITY > APPLICATION i SIZE?
YES
NO
S122
LOCAL MEMORY REMAINING CAPACITY + APPLICATION j SIZE > APPLICATION i SIZE?
YES
NO
S123
PRELOAD BY OVERWRITING APPLICATION j IN LOCAL MEMORY USING APPLICATION i

FIG. 47A title #1 DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	READ ATTRIBUTE	READ PRIORITY
title #1	application #1	Preload	mandatory
title #1	application #1	Preload	optional:high
title #1	application #1	Preload	optional:low

FIG. 47B

OCCUPIED AREA OF LOCAL MEMORY

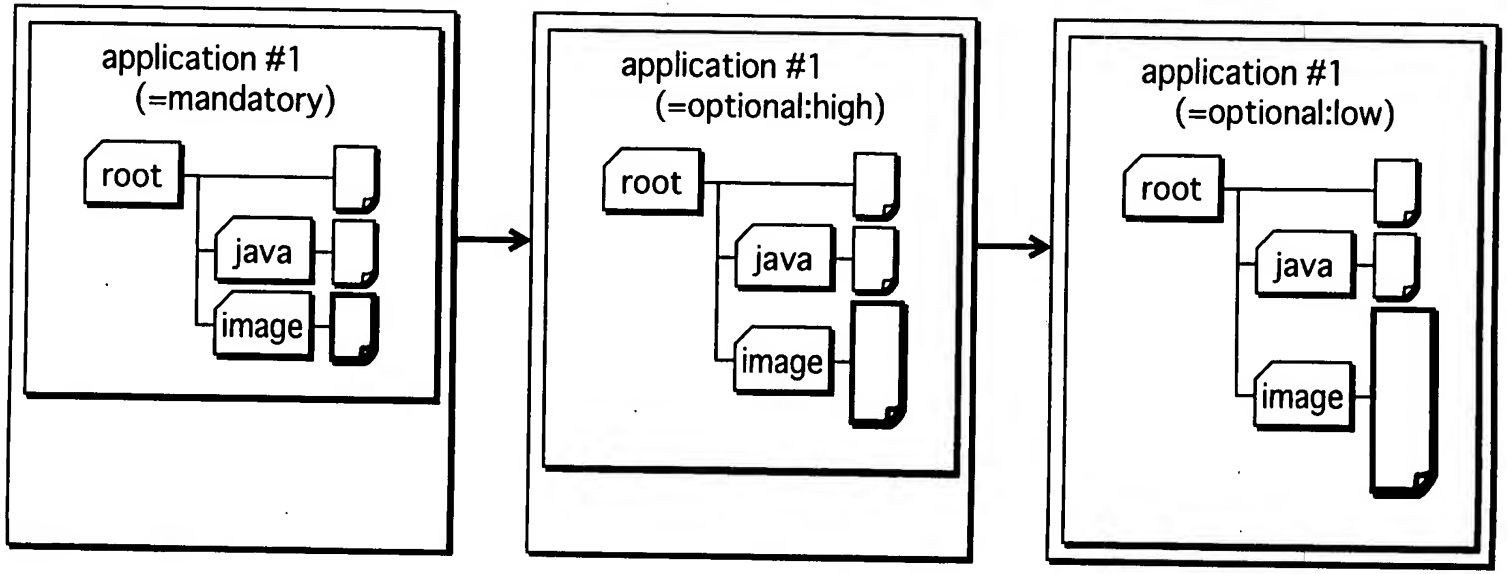

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FIG. 48A title #1 DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	READ ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1	Preload	mandatory
title #1:chapter #1-#2	application #2	Load	mandatory
title #1:chapter #4-#5	application #3	Load	mandatory
title #1	application #3	Preload	optional

FIG. 48B

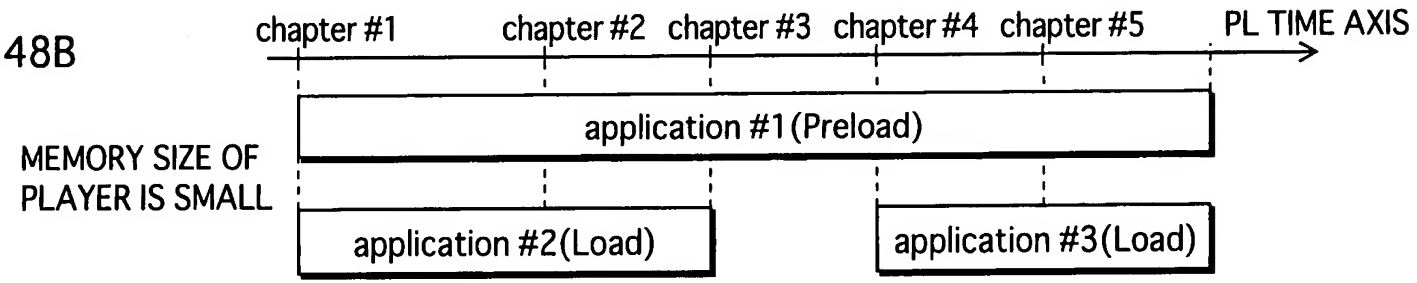

FIG. 48C

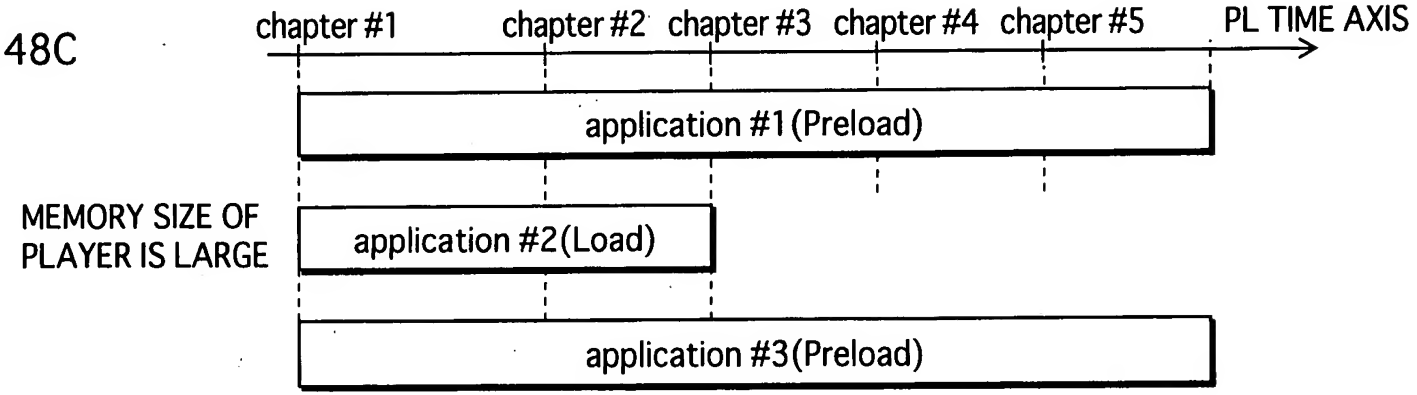

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FIG. 49

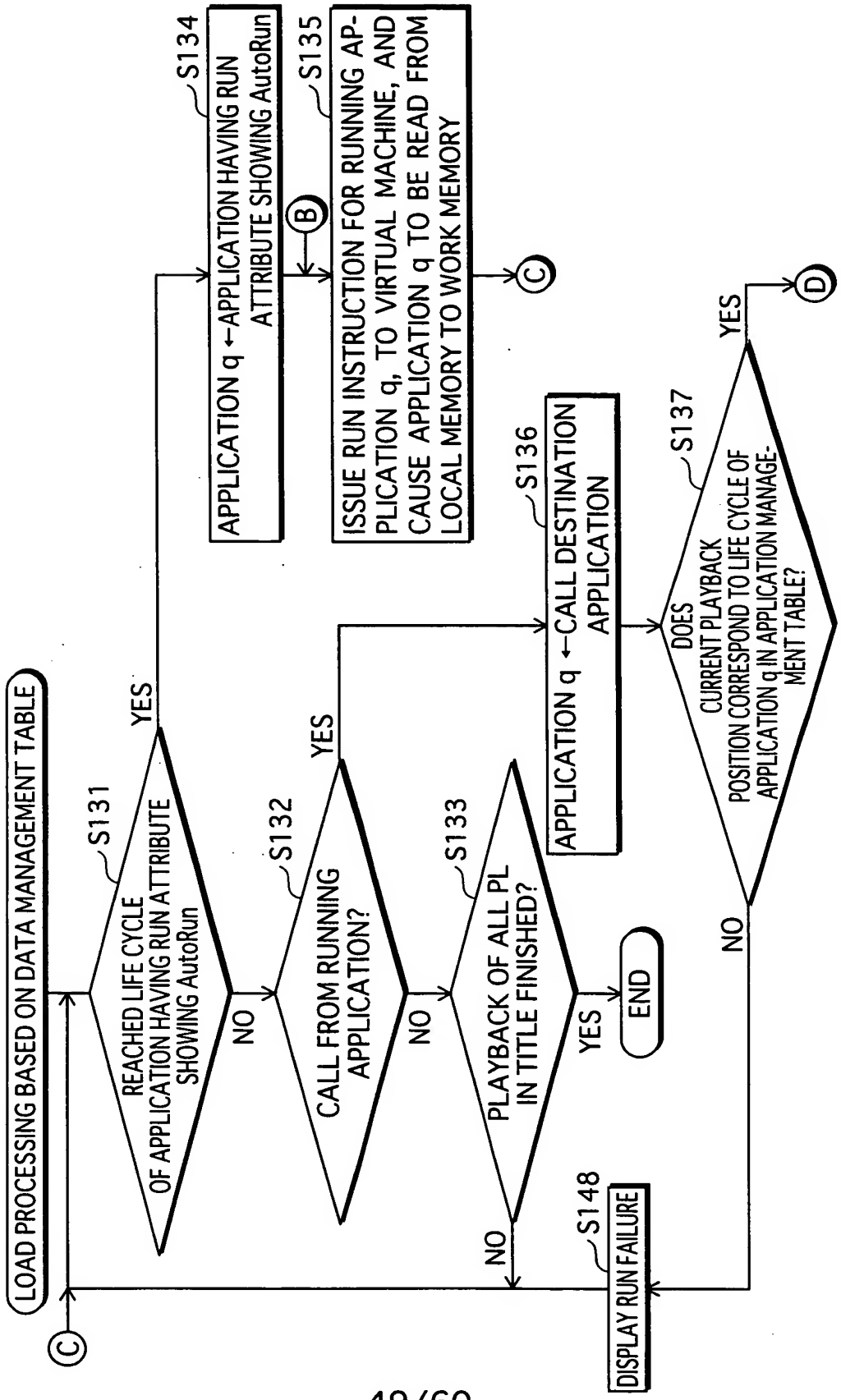

LOAD PROCESSING BASED ON DATA MANAGEMENT TABLE
S131
REACHED LIFE CYCLE OF APPLICATION HAVING RUN ATTRIBUTE SHOWING AutoRun
YES
NO
S132
CALL FROM RUNNING APPLICATION?
YES
NO
S133
PLAYBACK OF ALL PL IN TITLE FINISHED?
YES
NO
END
S134
APPLICATION q ←APPLICATION HAVING RUN ATTRIBUTE SHOWING AutoRun
S135
ISSUE RUN INSTRUCTION FOR RUNNING APPLICATION q, TO VIRTUAL MACHINE, AND CAUSE APPLICATION q TO BE READ FROM LOCAL MEMORY TO WORK MEMORY
S136
APPLICATION q ←CALL DESTINATION APPLICATION
S137
DOES CURRENT PLAYBACK POSITION CORRESPOND TO LIFE CYCLE OF APPLICATION q IN APPLICATION MANAGEMENT TABLE?
YES
NO
S148
DISPLAY RUN FAILURE
A
B
C
D

FIG. 50

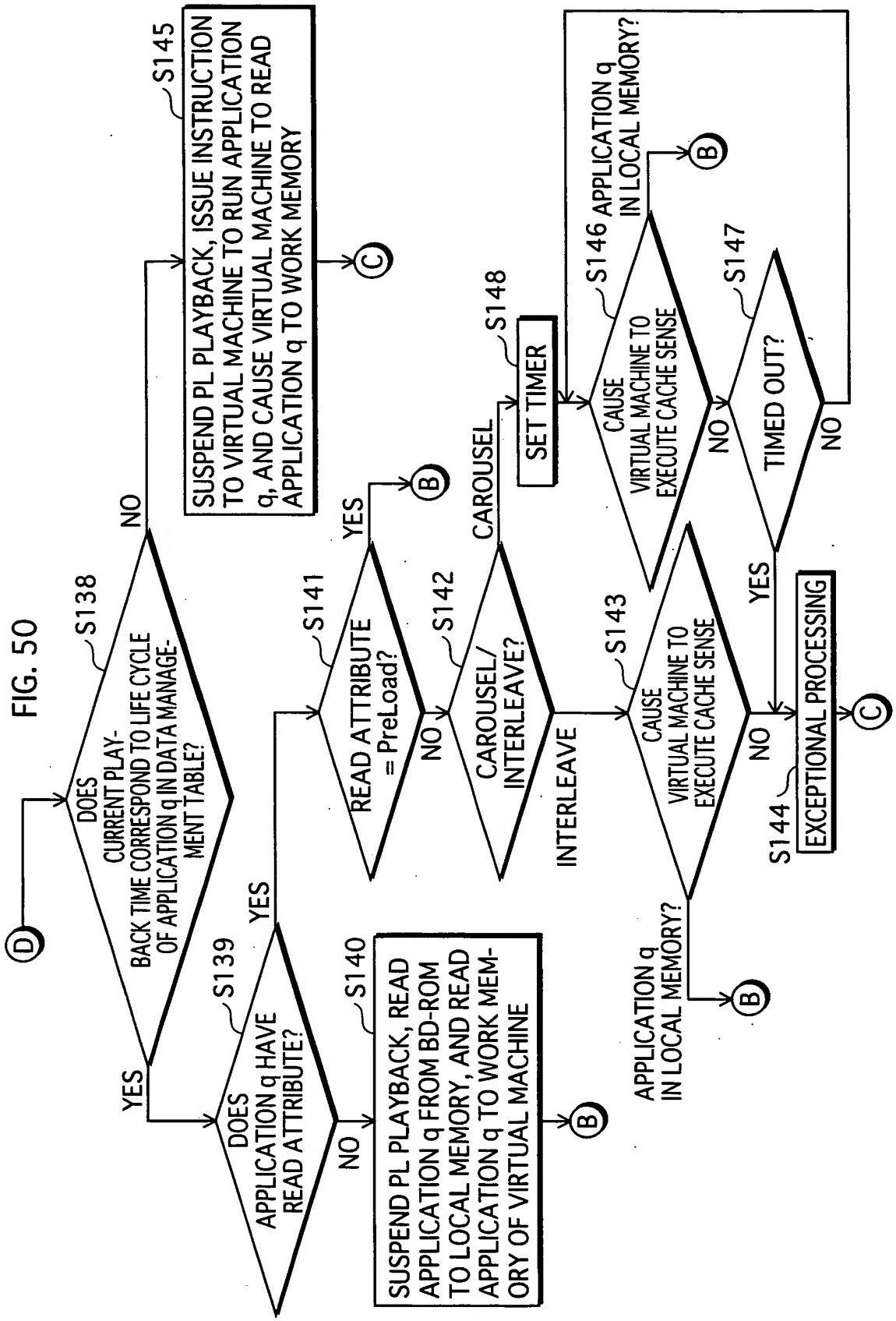

D
S138
DOES CURRENT PLAY-BACK TIME CORRESPOND TO LIFE CYCLE OF APPLICATION q IN DATA MANAGE-MENT TABLE?
NO
S145
SUSPEND PL PLAYBACK, ISSUE INSTRUCTION TO VIRTUAL MACHINE TO RUN APPLICATION q, AND CAUSE VIRTUAL MACHINE TO READ APPLICATION q TO WORK MEMORY
C
YES
S139
DOES APPLICATION q HAVE READ ATTRIBUTE?
YES
S141
READ ATTRIBUTE = PreLoad?
YES
B
NO
S140
SUSPEND PL PLAYBACK, READ APPLICATION q FROM BD-ROM TO LOCAL MEMORY, AND READ APPLICATION q TO WORK MEM-ORY OF VIRTUAL MACHINE
B
NO
S142
CAROUSEL/ INTERLEAVE?
CAROUSEL
S148
SET TIMER
INTERLEAVE
S143
CAUSE VIRTUAL MACHINE TO EXECUTE CACHE SENSE
APPLICATION q IN LOCAL MEMORY?
B
S146 APPLICATION q IN LOCAL MEMORY?
B
CAUSE VIRTUAL MACHINE TO EXECUTE CACHE SENSE
NO
S147
TIMED OUT?
YES
NO
S144
EXCEPTIONAL PROCESSING
C

FIG. 51

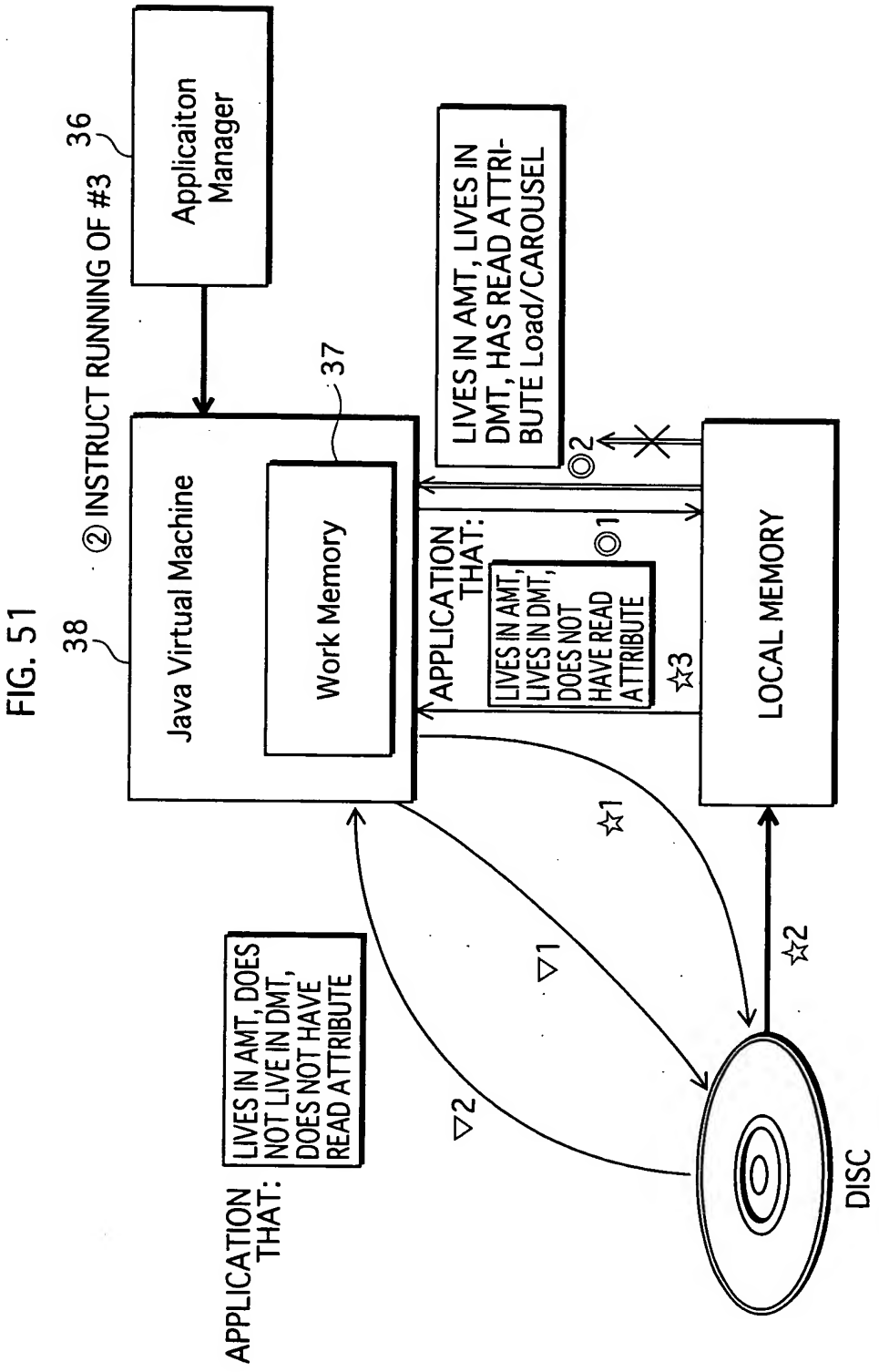

Applicaiton Manager
36
② INSTRUCT RUNNING OF #3
Java Virtual Machine
38
Work Memory
37
LIVES IN AMT, LIVES IN DMT, HAS READ ATTRIBUTE Load/CAROUSEL
◎2
APPLICATION THAT:
LIVES IN AMT, LIVES IN DMT, DOES NOT HAVE READ ATTRIBUTE
◎1
☆3
LOCAL MEMORY
☆1
☆2
▽1
▽2
APPLICATION THAT:
LIVES IN AMT, DOES NOT LIVE IN DMT, DOES NOT HAVE READ ATTRIBUTE
DISC

FIG. 52A

ZZZZZ. BD-J

resume_intention_flag
menu_Call_Mask
title_search_mask
Application Management Table(AMT)
Data Management Table(DMT)
PlayList Management Table(PLMT)

FIG. 52B

PL MANAGEMENT TABLE

PLAYLIST ID	PLAYBACK ATTRIBUTE
— —	Auto Play
— —	— —

FIG. 52C

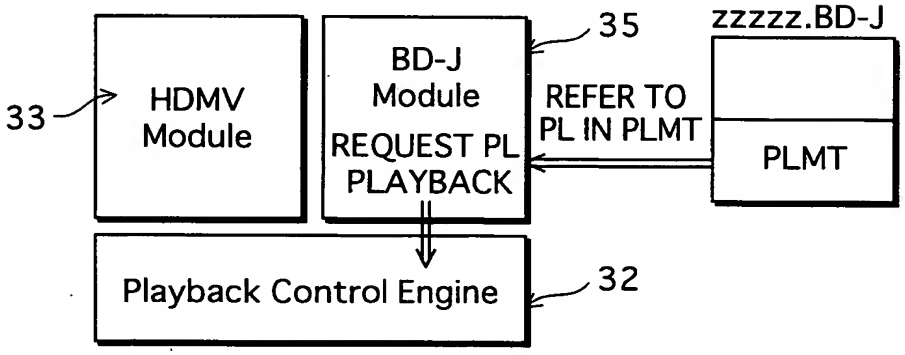
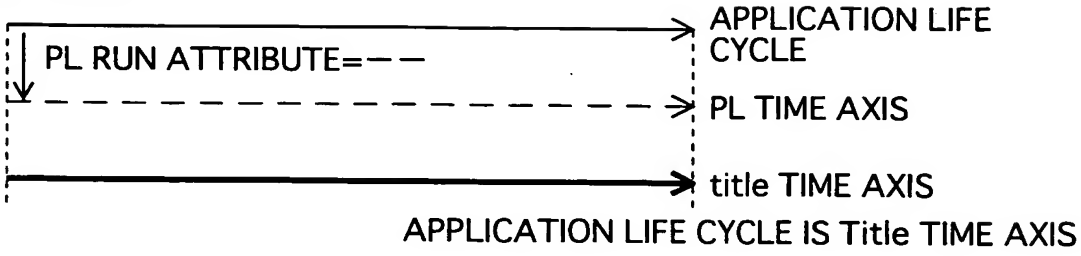
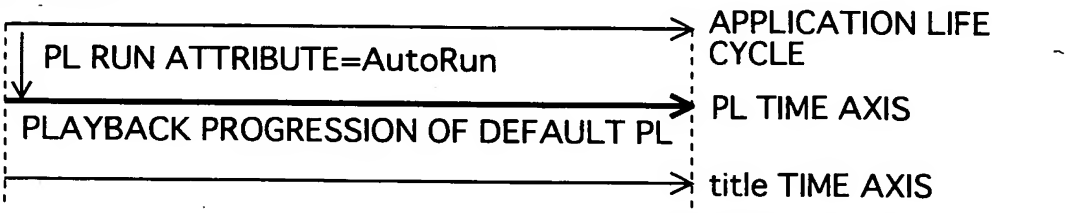


FIG. 53A



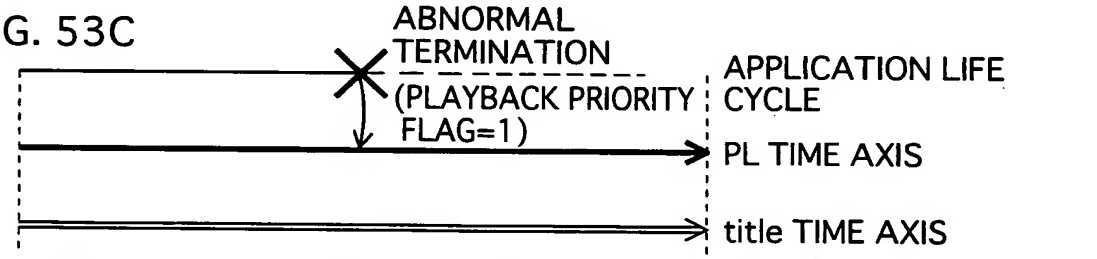
APPLICATION LIFE CYCLE IS Title TIME AXIS

FIG. 53B



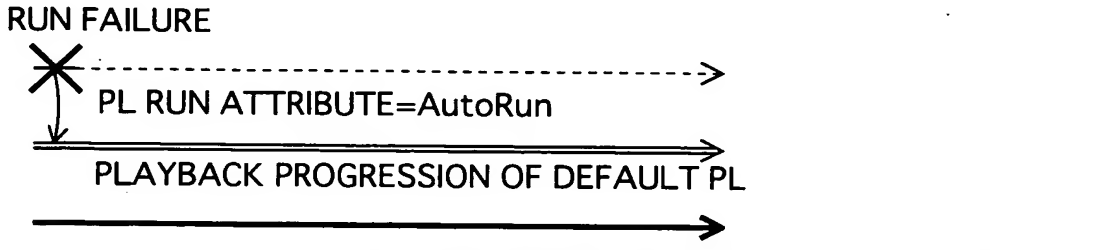
PL TIME AXIS IS Title TIME AXIS

FIG. 53C



APPLICATION LIFE CYCLE + PL TIME AXIS OF DEFAULT PL IS Title TIME AXIS

FIG. 53D



PL TIME AXIS OF DEFAULT PL IS Title TIME AXIS

FIG. 54

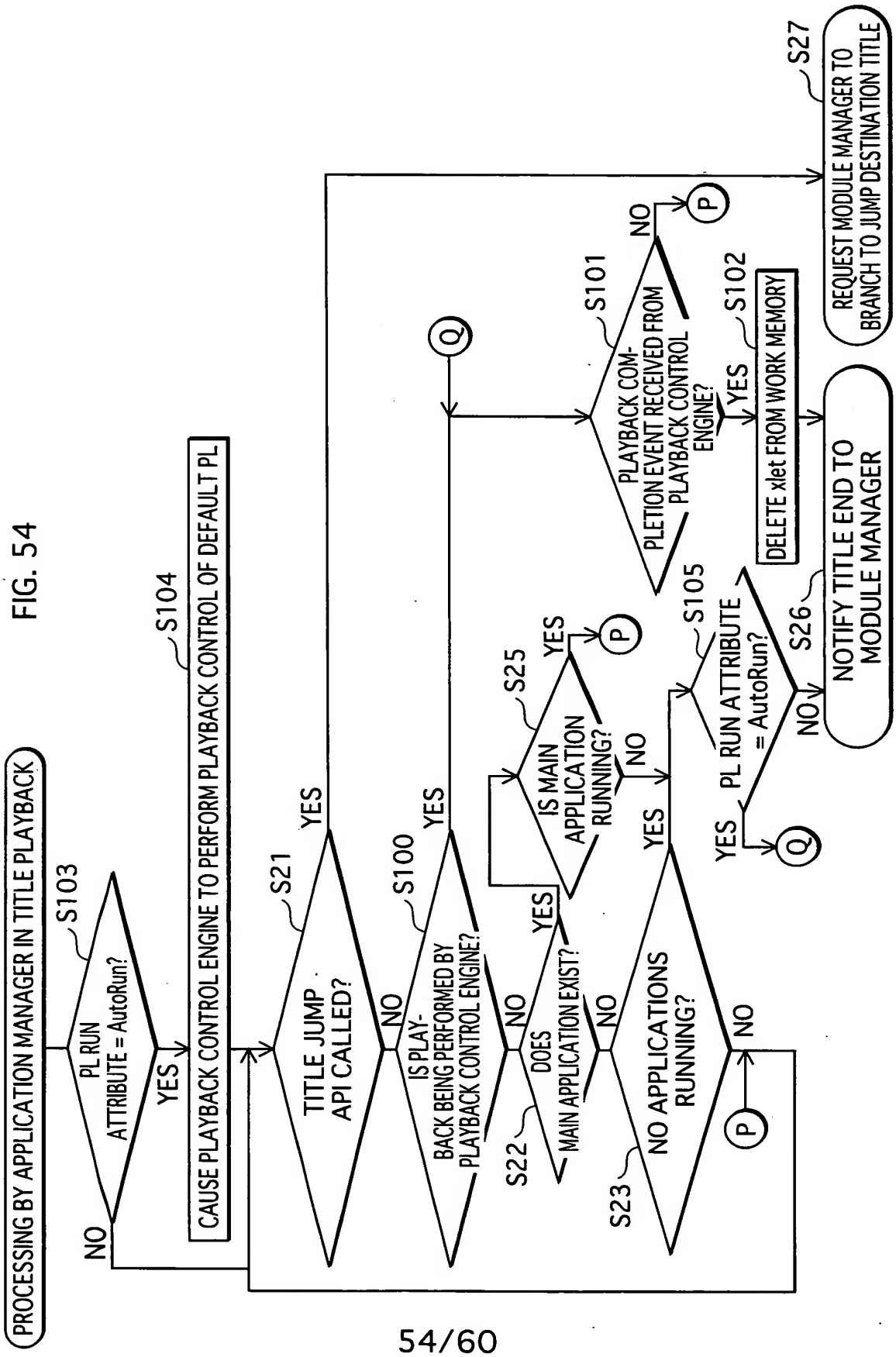

PROCESSING BY APPLICATION MANAGER IN TITLE PLAYBACK
S103
PL RUN ATTRIBUTE = AutoRun?
YES
NO
S104
CAUSE PLAYBACK CONTROL ENGINE TO PERFORM PLAYBACK CONTROL OF DEFAULT PL
S21
TITLE JUMP API CALLED?
YES
NO
S100
IS PLAY-BACK BEING PERFORMED BY PLAYBACK CONTROL ENGINE?
YES
NO
S22
DOES MAIN APPLICATION EXIST?
YES
NO
S23
NO APPLICATIONS RUNNING?
YES
NO
S25
IS MAIN APPLICATION RUNNING?
YES
NO
S105
PL RUN ATTRIBUTE = AutoRun?
YES
NO
S26
NOTIFY TITLE END TO MODULE MANAGER
S101
PLAYBACK COM-PLETION EVENT RECEIVED FROM PLAYBACK CONTROL ENGINE?
YES
NO
S102
DELETE xlet FROM WORK MEMORY
S27
REQUEST MODULE MANAGER TO BRANCH TO JUMP DESTINATION TITLE
P
Q

FIG. 55

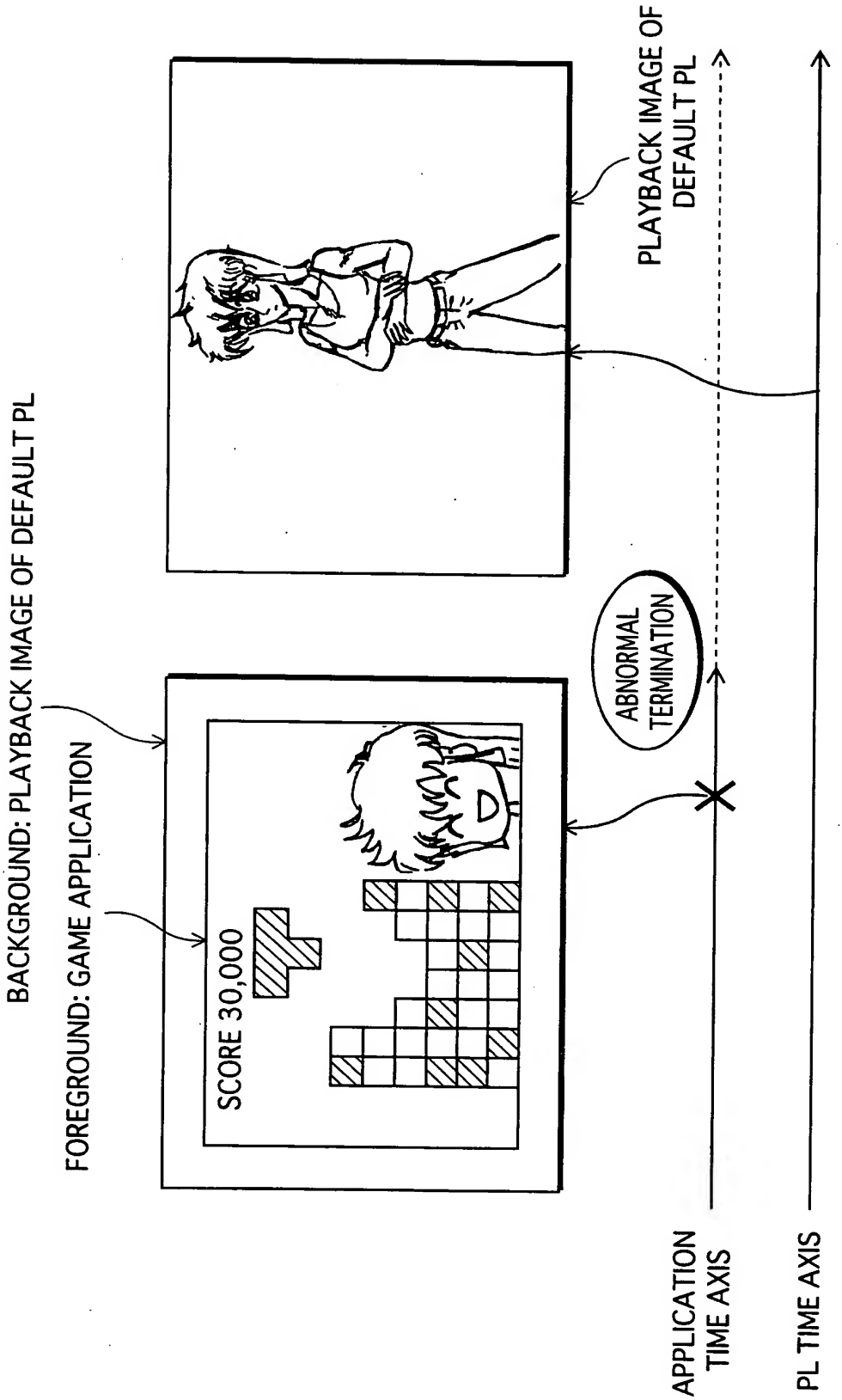

BACKGROUND: PLAYBACK IMAGE OF DEFAULT PL
FOREGROUND: GAME APPLICATION
SCORE 30,000
ABNORMAL TERMINATION
PLAYBACK IMAGE OF DEFAULT PL
APPLICATION TIME AXIS
PL TIME AXIS

FIG. 56A

APPLICATION AND DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	RUN ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1	AutoRun	
title #1:chapter #1-#3	application #2	Ready	
title #1	application #3	— —	
title #1:chapter #2-#4	application #4	Ready	

RUN ATTRIBUTE + READ ATTRIBUTE

FIG. 56B

RUN ATTRIBUTE	PRELOAD BEFORE AV STREAM PLAYBACK	AUTO-RUN /CALL RUN	LOAD TO LOCAL MEMORY	LIVES /DOES NOT LIVE
AutoRun	○	AUTO	NO	LIVES
AutoRun	×	AUTO	YES	LIVES
READY	○	CALL	NO	LIVES
READY	×	CALL	YES	LIVES
NOT SPECIFIED	×	CALL	NO	LIVES

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FIG. 57

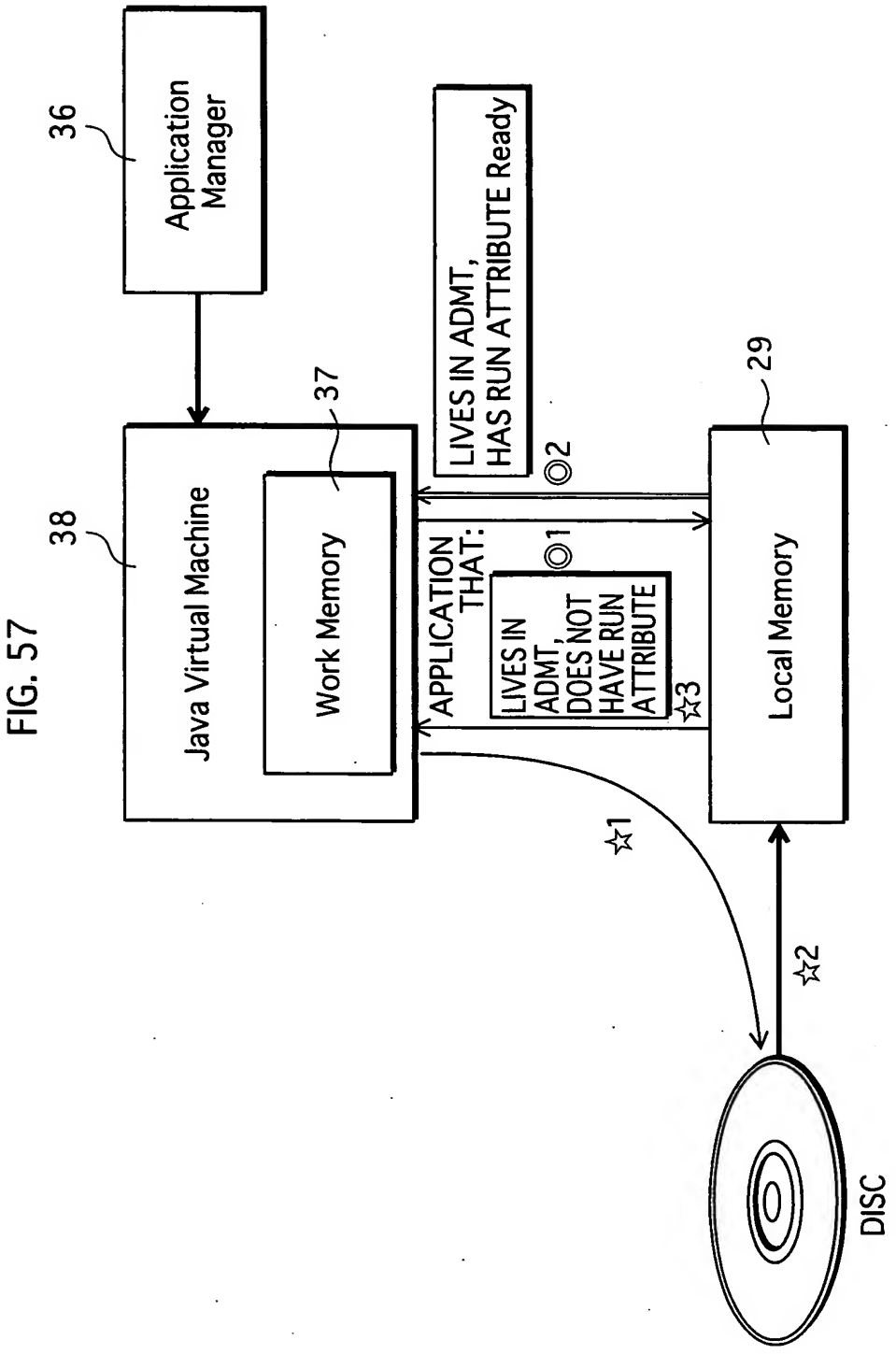
36
Application Manager
37
38
Java Virtual Machine
Work Memory
LIVES IN ADMT, HAS RUN ATTRIBUTE Ready
◎2
APPLICATION THAT:
◎1
LIVES IN ADMT, DOES NOT HAVE RUN ATTRIBUTE
☆3
29
Local Memory
☆1
☆2
DISC

FIG. 58A DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	READ ATTRIBUTE	READ PRIORITY LEVEL
title #1	application #1	Preload	mandatory
title #1	application #2	Preload	option, 255
title #1	application #3	Preload	option, 128

FIG. 58B

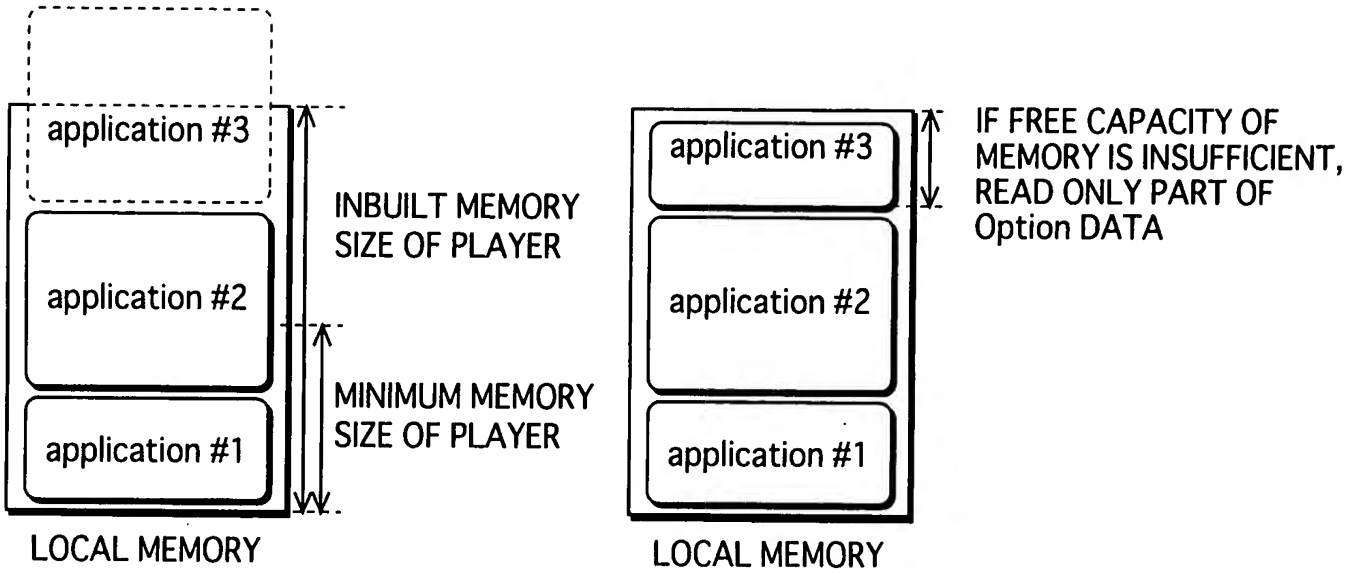

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FIG. 59A DATA MANAGEMENT TABLE

LIFE CYCLE	application ID	LOAD ATTRIBUTE	READ PRIORITY LEVEL	GROUP ATTRIBUTE
title #1	application #1		mandatory	—
title #1	application #2		optional	group #1
title #1	application #3		optional	group #1

FIG. 59B

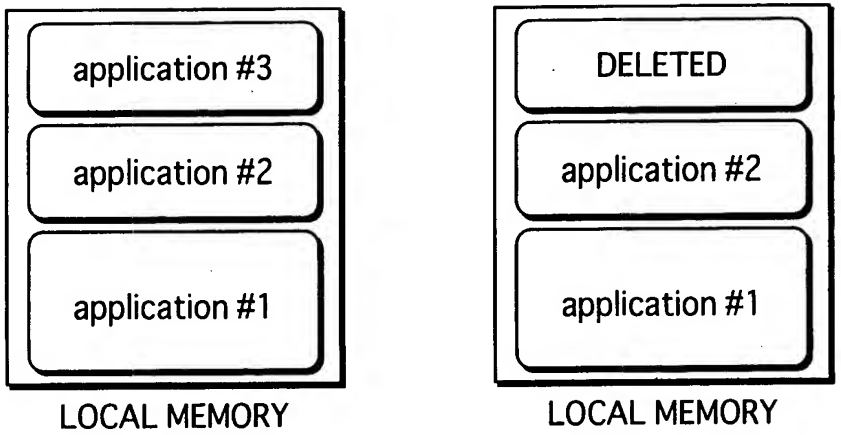

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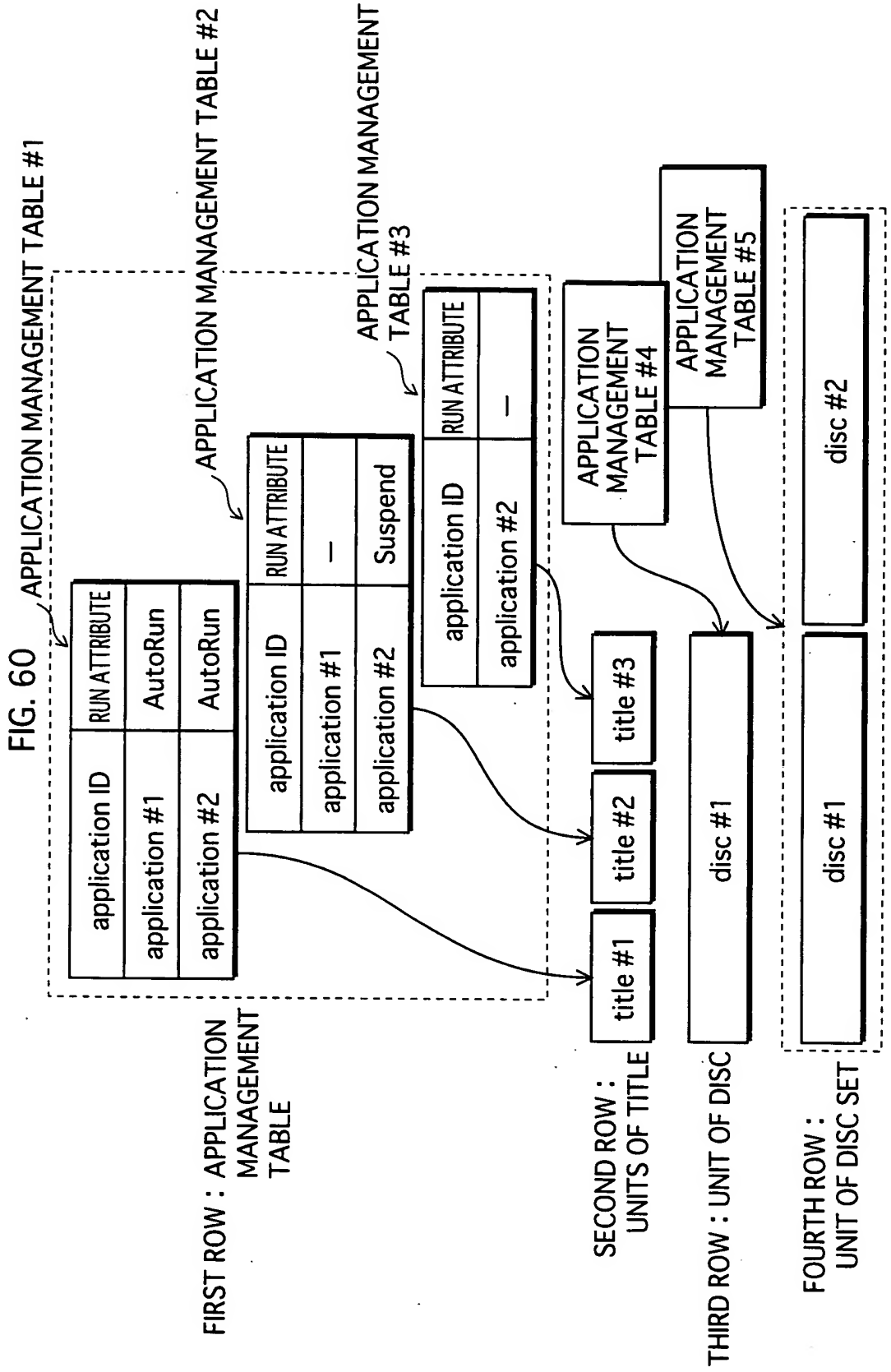
FIG. 60


APPLICATION MANAGEMENT TABLE #1
application ID
RUN ATTRIBUTE
application #1
AutoRun
application #2
AutoRun
APPLICATION MANAGEMENT TABLE #2
application ID
RUN ATTRIBUTE
application #1
—
application #2
Suspend
APPLICATION MANAGEMENT TABLE #3
application ID
RUN ATTRIBUTE
application #2
—
APPLICATION MANAGEMENT TABLE #4
APPLICATION MANAGEMENT TABLE #5
title #1
title #2
title #3
disc #1
disc #1
disc #2
FIRST ROW : APPLICATION MANAGEMENT TABLE
SECOND ROW : UNITS OF TITLE
THIRD ROW : UNIT OF DISC
FOURTH ROW : UNIT OF DISC SET